ALBERTA INNOVATES

CLEAN RESOURCES

ENVIRONMENTAL INNOVATION

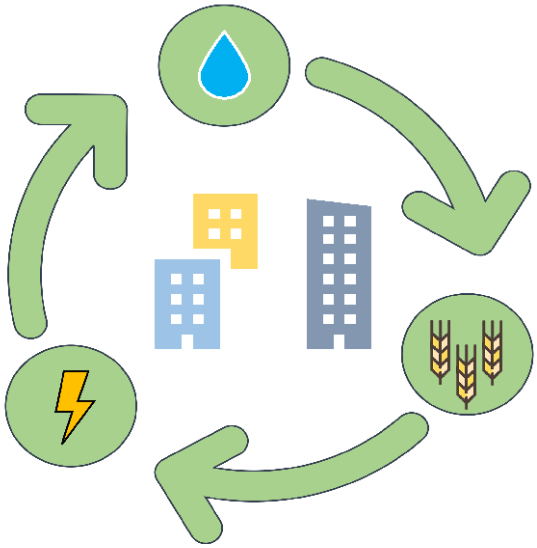
WATER INNOVATION PROGRAM

FUNDING DETAILS

Decentralized Wastewater Treatment by Resource Recovery

Over the last decade, energy consumption by the municipal water and wastewater sector has increased considerably. As a result, utilities can account for 40-60% of a municipality's energy bill.

This project includes a full-scale source-separated and decentralized water management system initially focused on blackwater resource recovery. Once proven, it will have the capacity to service a 1,700 person-equivalent greenfield community as a showcase for sustainable urban development. The project will demonstrate capacity for blackwater energy and nutrient recovery, suited to urban communities and remote rural settlements.



RECIPIENT:
Waterwerx Renewables Inc.

PARTNERS:
University of Alberta, DeSaH

TOTAL BUDGET:
$2,004,500

AI FUNDING:
$1,000,000

PROJECT DATES:
MARCH 2017 – JULY 2021

PROJECT TRL:
Start: 7
End: 8

APPLICATION

The domestic wastewater treatment industry is projected to grow for the next 30 years, driven largely by regulatory influence (prompting $10B in upgrades), and infrastructure deficits ($82B repair/maintenance/replacement). Innovative fiscally-driven systems will be instrumental in bridging the growing demand/funding gap for urban, rural and remote communities. Moreso, decentralized systems that are scalable and modular offer market-sensitive "build as needed" solutions that are far less capital and risk-intensive than conventional centralized systems.

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PROJECT GOALS

The overall objective of this project is to demonstrate the relevance, feasibility and economic value of energy-positive decentralized wastewater treatment systems suited to Canadian conditions. Specific goals include:

- Design, construction and commissioning of a blackwater treatment system (UASB-OLAND-struvite) capable of meeting wastewater treatment needs for 1700 people.
- Optimizing the treatment process to meet the applicable guidelines for municipal wastewater systems.
- Optimizing biogas production with methane content of about 80% of produced biogas.
- Achieve nitrogen and phosphorous removal that satisfies effluent guidelines.
- Demonstrate an overall cost savings of 25% compared to conventional treatment at a centralized wastewater treatment plant.

BENEFITS TO ALBERTA

Targeted outcomes of this technology have the potential to:

- Foster enhanced fiscal sustainability, resilience & environmental stewardship.
- Shape regulatory frameworks to advance net zero communities.
- Create sustainable, resilient and integrated infrastructure & planning solutions for urban, rural & Indigenous Peoples communities.
- Empower communities through municipal outreach and future training programs (e.g., Fit-For-Purpose options).
- Cross-sector collaboration targeting rapidly expanding global water industry & low carbon economy.
- Advance 'complete communities' model (thriving local economies, community vitality, & healthy ecosystems).
- Reduce biosolids production.
- Recover up to 90% of phosphorous from wastewater streams.

5 Publications

3 Students Trained

1 Project Job

> 20 Future Jobs

1 New Products/Services

1 Spinoff Company

40% ↓ in Energy Consumed for Wastewater Treatment

CURRENT STATUS

APRIL 2020

Bench-scale research at the University of Alberta campus is ongoing. Onsite micro-pilot plant providing proof of concept is complete. Blackwater feedstock/food waste characterization, process design and equipment engineering is complete. Life-cycle assessment, greywater treatment options identification, & equipment fabrication is underway. Draft facilitating regulatory framework underway. Province-wide stakeholder engagement on integrated management of community-scale water management is ongoing.