



Converting landfill gas to RNG in Edmonton

Project in Progress

The Clover Bar Landfill in Edmonton, Alberta recovers landfill gas to generate renewable energy. The site has been recovering and converting the gas into electricity since 2005 and is currently early in the process of developing a new system to convert the gas produced from decomposing landfill organics into renewable natural gas (RNG) for injection into Alberta's natural gas distribution system.

The overarching goals of the project are to increase the environmental sustainability and economic viability of the facility through the reduction of greenhouse gas (GHG) emissions. It will also help advance Edmonton towards its goal of being carbon neutral as a municipality by 2050. Initial project planning began in 2020 and work to scope, design and procure the project is underway.

Stakeholders

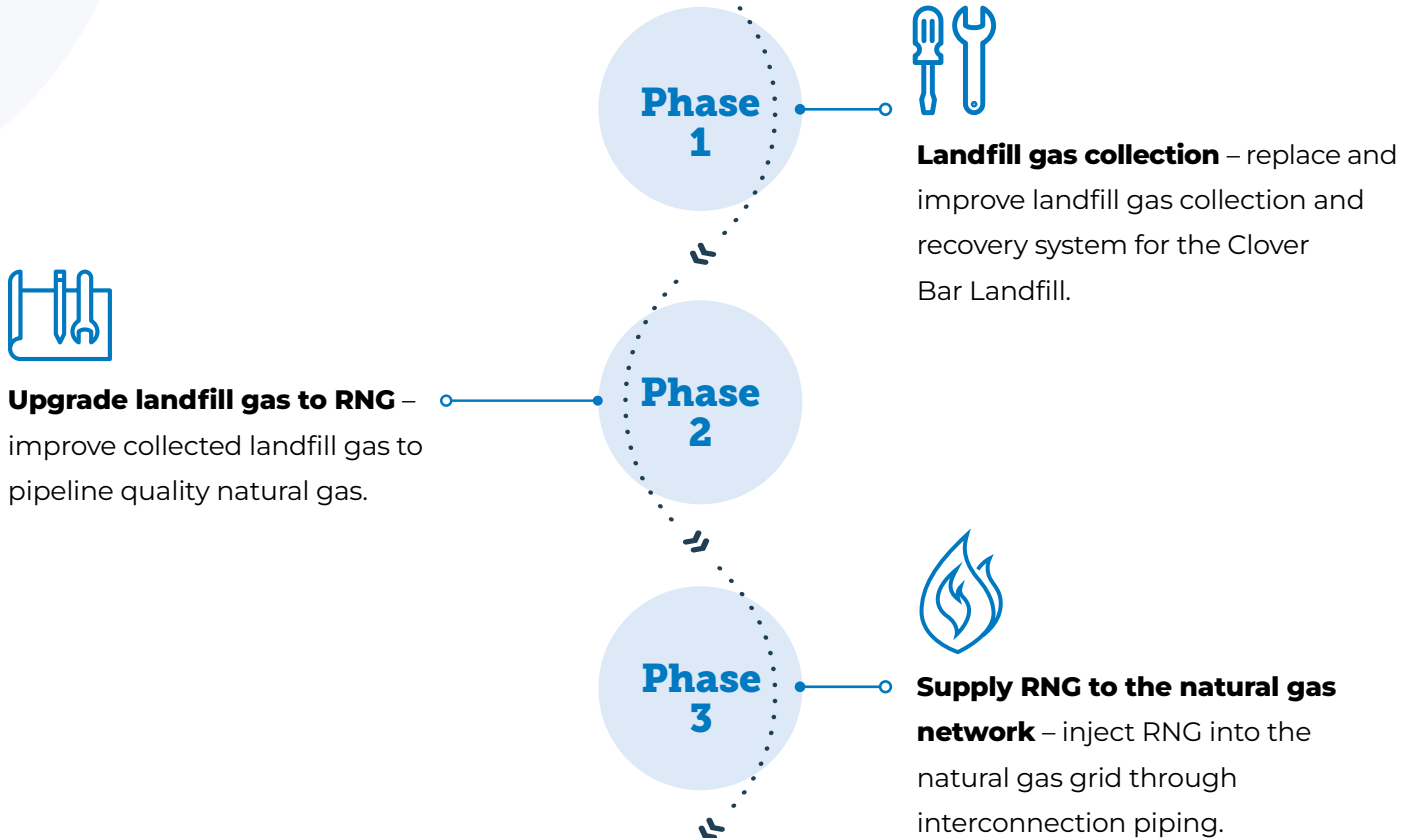
The landfill gas produced by the Clover Bar Landfill is presently co-owned by the City of Edmonton and Capital Power. For 16 years, Capital Power has worked collaboratively with the City, managing the landfill gas collection system to produce electricity, retaining 100 per cent of the sale of electricity and sharing a portion of the GHG credits with the City.

Project stakeholders include the City of Edmonton, Emissions Reductions Alberta and Capital Power, who is also the construction project manager. Capital Power would also invest in the eventual RNG conversion facility and would share the profits generated from the sale of the RNG and environmental credits produced.



Project scope and timeline

Working to achieve the project goals of reducing GHG emissions while enhancing the environmental sustainability and economic viability of landfill gas management, the group has divided the scope of the project into three phases.



Lessons learned so far

While the transition from producing electricity to RNG from landfill gas is still in its early stages, project stakeholders have learned a few lessons along the way.

Lesson #1

The importance of synergizing private and public sector procurement and decision-making approaches.



This RNG project relies on working with and combining various levels of government with private sector companies at every step of the way.

Project managers learned early in the process the importance of engaging everyone in a productive manner, including prioritizing communications and establishing a streamlined decision-making process. A thorough understanding of regulations and trade implications,



including competitive policies, free trade agreements and compliance requirements is essential to each partner. Establishing a fair and transparent procurement process also needs to include significant input from every partner.

Lesson #2

Scoping of procurement to ensure operational efficiencies.



When it comes to undertaking such a complex project, a firm understanding of the existing landfill is essential. In the case of the Clover Bar Landfill, having a high level of confidence and understanding of the landfill gas quality and composition is required. The project team has an advantage in this situation, having managed the landfill gas for the production of electricity. The team already has an intimate understanding of the importance of gas quality, or rather, the implications unknown gas quality can have on available technology options and final product output. That's why they will be prioritizing a flexible design to incorporate a range of gas qualities and expandability as required. They have considered the operations and cost implications and as a result, have designed a collection system that has enough flexibility to fine-tune and optimize gas quality and flow.



Lesson #3

Flexibility and adaptability for risk management, identification and mitigation.



Just like any other project, the ability to be flexible and adaptable is essential. The project management team quickly realized these skills were especially important in the early stages of the design and construction sequencing when dealing with delivery and supply chain impacts. The team also learned the importance of interdisciplinary cohesion and how to balance solutions with boundary limits of design integrations.

Investing in green energy projects

In alignment with the City of Edmonton's objectives, its Waste Services branch is focused on leveraging its resources while reducing its carbon footprint and has invested in a variety of projects that complement the future RNG generation facility.



Refuse-derived Fuel Facility

At Edmonton's Refuse Derived Fuel plant, garbage is processed and turned into refuse-derived fuel (RDF), or "garbage fluff." Making RDF involves:

- Mechanically separating municipal solid waste that cannot be recycled or composted (waste that has traditionally been sent to landfill, such as carpets and shoes)
- Removing inert contaminants
- Removing precious metals that can be recycled
- Shredding remaining waste into approximately 40 mm pieces
- Drying the shredded waste

The City's expertise in developing RDF has potential applications in various waste-to-energy processes.

Waste-to-Energy

The City recently entered into an agreement with Varme Energy to generate green electricity and industrial heat while enabling the diversion of

at least 150,000 tonnes of residential garbage from landfill per year beginning as early as 2027.

This type of waste-to-energy facility combusts garbage to produce steam that either generates electricity or provides heat for industrial processes.

This facility will complement the work done at the Edmonton Waste Management Centre to sort and process residential waste. By putting residual garbage to use as a fuel source, the City can keep more waste out of the landfill and contribute to Edmonton's green energy transition.

The information in this project snapshot has been provided by project stakeholders, partners and managers to educate the public and municipalities about the benefits of RNG production.



The Canadian Biogas Association is a member-driven industry organization that supports the diverse needs of the biogas and renewable natural gas (RNG) sector with the goal of building a strong, robust biogas & RNG industry in Canada. We represent companies that span the interests of biogas & RNG production. By working with the agricultural sector we can strengthen both industries by maximizing the utilization of organics, such as manure and food waste to produce renewable energy and fertilizer.

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