MSW SUCCESS STORY

Capture and Beneficial Use of LFG/Leachate at the Salmon Arm Landfill

Salmon Arm, British Columbia, Canada

Columbia Shuswap Regional District/FortisBC

OVERVIEW OF MSW PROJECT

The Salmon Arm Landfill, which began filling in the 1970s, is owned by the Columbia Shuswap Regional District. The Salmon Arm Landfill is a sanitary landfill with a designed area of waste placement totaling 25 hectares. Currently, there are 360,000 tonnes of waste in place with an average waste depth of 15 meters. The design capacity is 3,000,000 cubic meters and the landfill is expected to close in 2050.

The project has been developed in two stages. LFG flaring commenced in February 2010 and converting from flaring to a system that upgrades the biogas to pipeline quality commenced in September 2012.

TYPE OF PROJECT: Landfill Gas (LFG) Flaring and LFG Energy Recovery

ACTUAL ANNUAL EMISSION REDUCTIONS: 8,700 MTCO$_2$E

PROJECT HIGHLIGHT(S)

This is the first project in British Columbia to recover raw biogas from a landfill and upgrade it to pipeline quality renewable natural gas. In addition, this is one of the smallest landfills in North America to attempt such a project.

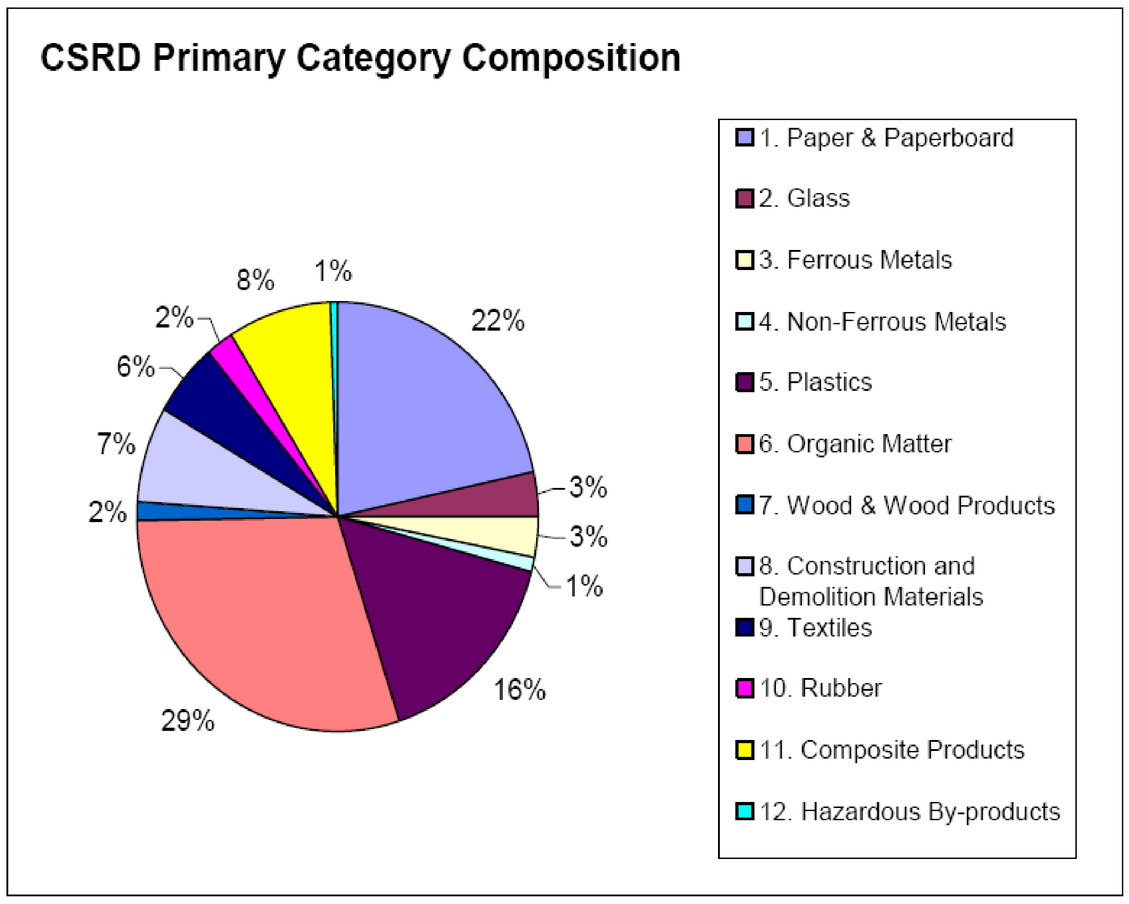
DISCLAIMER: The information and predictions contained within this poster are based on the data provided by the site owners and operators. The Global Methane Initiative (GMI) cannot take responsibility for the accuracy of these data. It should be noted that conditions on landfills will vary with changes in waste input, management practices, engineering practices, and environmental conditions (particularly rainfall and temperature). GMI does not guarantee the quantity or quality of available landfill biogas from the landfill site, which may vary from the values predicted in this report.

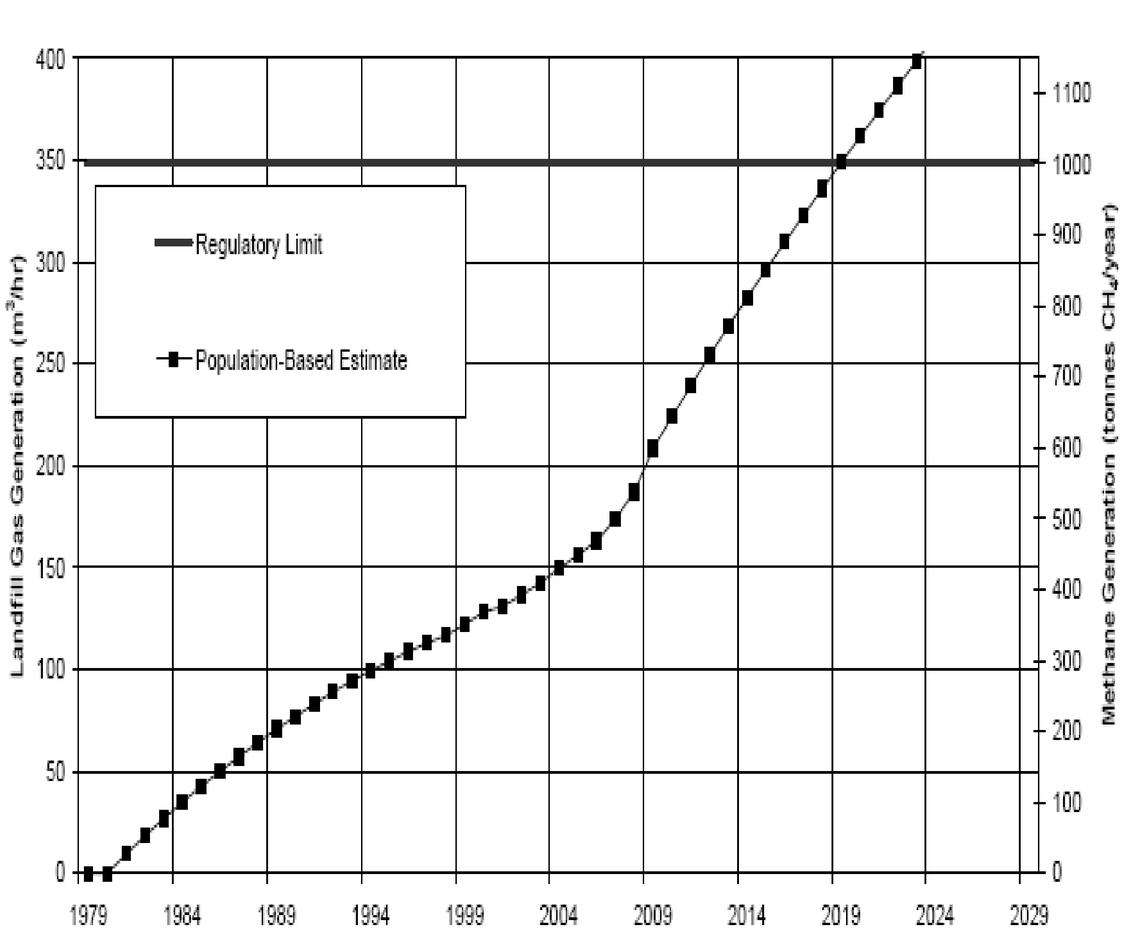
LANDFILL GAS AND ENERGY POTENTIAL

As per a contract with Pacific Carbon Trust, a crown corporation established to deliver British Columbia-based greenhouse gas offsets, Ruby Canyon Engineering verified emission reductions of 6,907 metric tonnes of CO_2e in 2011for the Salmon Arm landfill methane capture and use project.

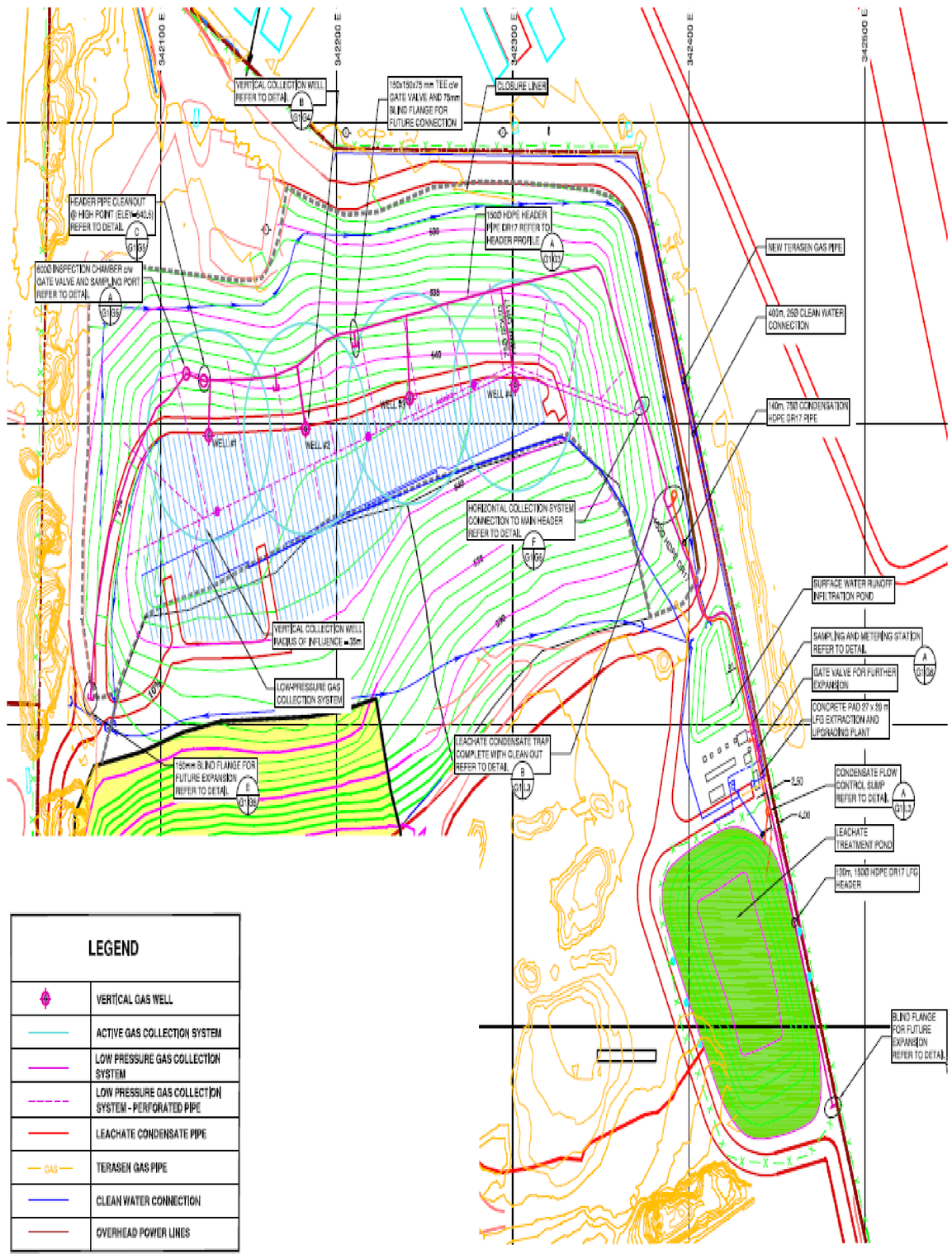
Other Landfill Physical/Operational Data

- Quantity of waste collected per day: 40 tonnes
- Quantity of waste accepted annually: 15,500 tonnes
- Quantity of waste generated per capita: 490 kg
- Alternative Daily cover is applied.
  (Revelstoke Iron Grizzly - Metal Plates)
- Closed portion of the landfill site is capped with HDPE liner.
- Closed portion of the landfill is unlined. The active portion is lined with HDPE liner.
- Waste compaction is performed.
- Landfill gas collection and control system: Landfill gas purification system with standby flaring system.
- Number of vertical or horizontal wells: 6 vertical wells and a series of horizontal wells.
- Average depth of wells: 20 meters.
- Leachate management: Leachate from the active portion of the landfill is collected and diverted to a lined pond, aerated and used to irrigate a hybrid poplar tree plantation. The plantation is located on the closed phase of the existing landfill and consists of 2,300 hybrid poplars.





k values (year^{-1})	0.02, 0.04, 0.09	Waste Composition	2006 SWCS [1]
L_o (weighted) (m^3 CH4/tonne)	20, 120, 160	Relatively Inert (%)	31.8%
Precipitation (mm/year)	669	Moderately Decomposable (%)	38.7%
Volumetric LFG Composition (percent methane)	50%	Decomposable (%)	29.6%



PROJECT ECONOMICS

Cost: $4,500,000 combined CSRD and FortisBC (includes landfill closure, gas collection, upgrading equipment)
Operation & Maintenance (US$/year): $25,000 CSRD + FortisBC costs (unavailable)
Funding Partners: FortisBC, BC Bioenergy Network, Province of BC (ICE Fund)

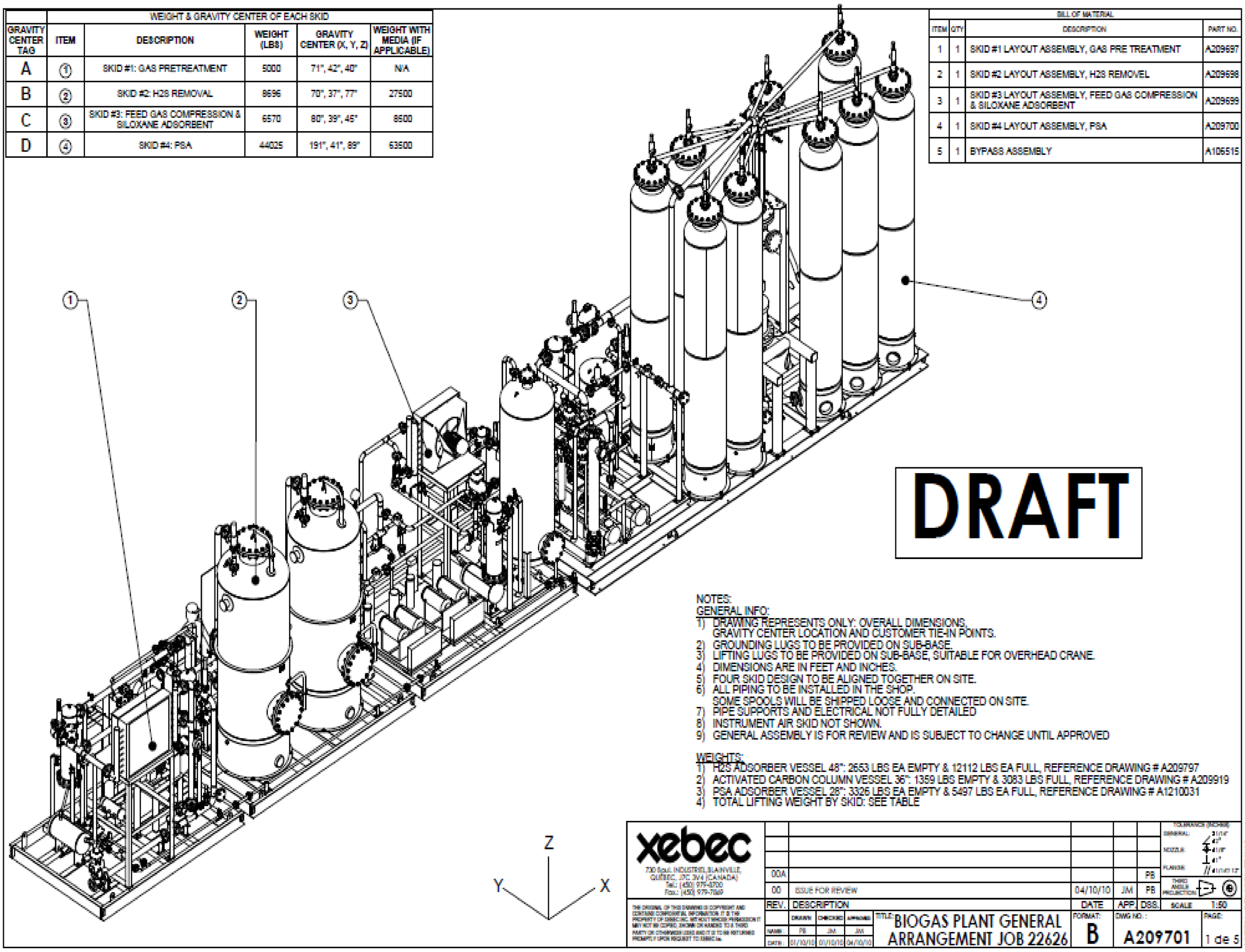
Estimated heating/other benefits: Offset the natural gas requirements of 300 to 500 homes and businesses in Salmon Arm
Estimated payback period (number of years): 20 years

ENVIRONMENTAL BENEFITS

A gas collection and flaring/upgrading system was installed in 2011 and as a result this landfill capture project has the opportunity to collect and destroy an average of 600,000 cubic meters of methane annually over the next 70 years. This is equivalent to emission reductions of more than 8,000 tonnes of CO_2e annually.

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Tonnes CO_2eq from Flaring/Upgrading Activities	8,000	8,100	8,200	8,300	8,400	8,500	8,600	8,700	8,800	8,900	9,000	9,100	9,200	9,300	9,400

LANDFILL BIOGAS UPGRADING SYSTEM



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