Landfill Gas Utilization

Update on Sale of Landfill Gas

Waste Optimization Study

- Methane gas contained in landfill gas
- Opportunity to generate energy
- Proven technology (further study)
  - Heat or Electricity
- Innovative technology (not economically feasible)
  - Compressed vehicle fuel
  - Methanol
  - Fuel cells to generate electricity

Waste Optimization Study
cont'd

- Market for Heat Energy
  - Industrial Property north of LS
  - Future Eco-industrial Park west of LS
- Market for Electricity
  - Industrial Property north of LS
  - Greater Sudbury Utilities (GSU)
- Recommendation

  Electricity to GSU

Waste Optimization Study
cont'd

- Benefits of Landfill Gas Utilization

  Reduce GHG emissions

  Good use of waste as a resource

  Replaces conventional sources of energy

  Cost-savings and/or revenue generation

Council Recommendation

March 24, 2005

- That staff be authorized to commence negotiations for an agreement with Genco to develop the landfill gas utilization project, as per the General Manager of Infrastructure & Emergency Services' report dated March 16, 2005.

Steps to be completed

Target dates

- Installation of collection system (CGS) Fall 2005 √
- Compilation data (CGS) 2006 √
- Order equipment (Genco) 2006 √
- Regulatory requirements (CGS & Genco) 2006
- Construct plant (Genco) **2007**
- Produce electricity (Genco) April 1st, 2007

Landfill site and Collection System

Connection to Blower

Flaring System

Collection and Flaring System

Compilation of data

Gas production rates

- Waste Optimazition Study estimated production: 375 cfm
- Current Performance: 480 cfm
- Methane content estimated: 45%
- Current Performance: 50%-55%

- **Results better than expected and will increase with continued site filling (2040+)**

Regulatory Approval Requirements

- Genco/Toromont Certificate of Approval

  - Application submitted

- CGS Certificate of Approval √
- Ontario Energy Board Act

  - Required Notices and Application submitted

- Planning Act √
- Municipal Act √
- Electricity Act √

Agreements

CGS, GSU, Genco & Toromont

- First Right of Refusal – SDEC √
- Agreement for the use of the landfill gas - Dec. 13
- Lease of Land for the Generating Plant - Dec. 13
- Operating Agreement for the Collection System - √
- Agreement to supply and construct the Generating Plant
  - Agreement being finalized
- Operating Agreement for the Generating Plant
  - Agreement being finalized
- Agreement for the sale of electricity (Standard Offer)
  - Application being prepared – need Council support

Sale of Gas / Lease of Land

April 1st, 2006 for 20 years

- Lease of City Land to Genco for the power plant

  Rent: $1,500/yr escalating $500/yr every 5 yrs

  Genco: Responsible to construct and maintain the power plant

  City: Responsible to maintain the gas collection system

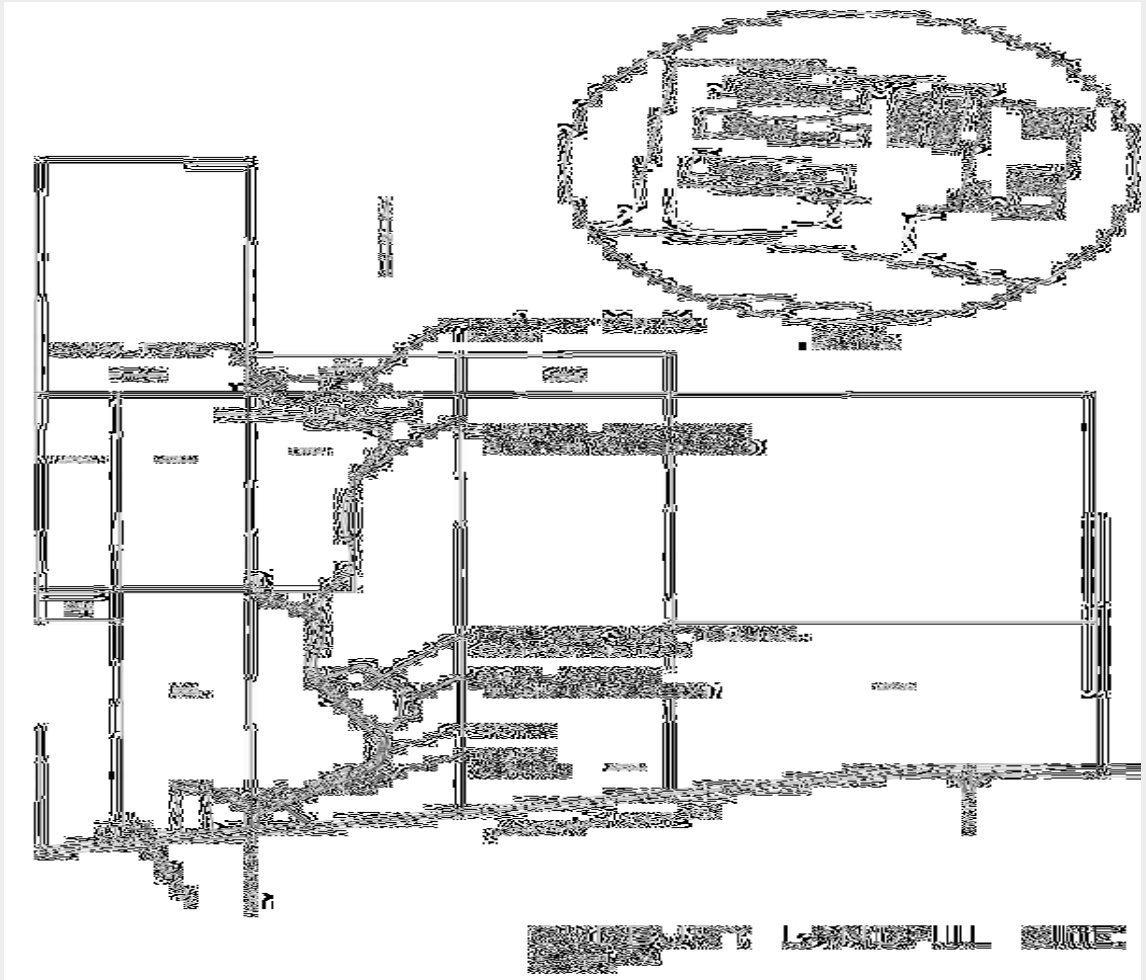
- Sale of Gas

  Quantity: All of the gas to supply one engine at full capacity

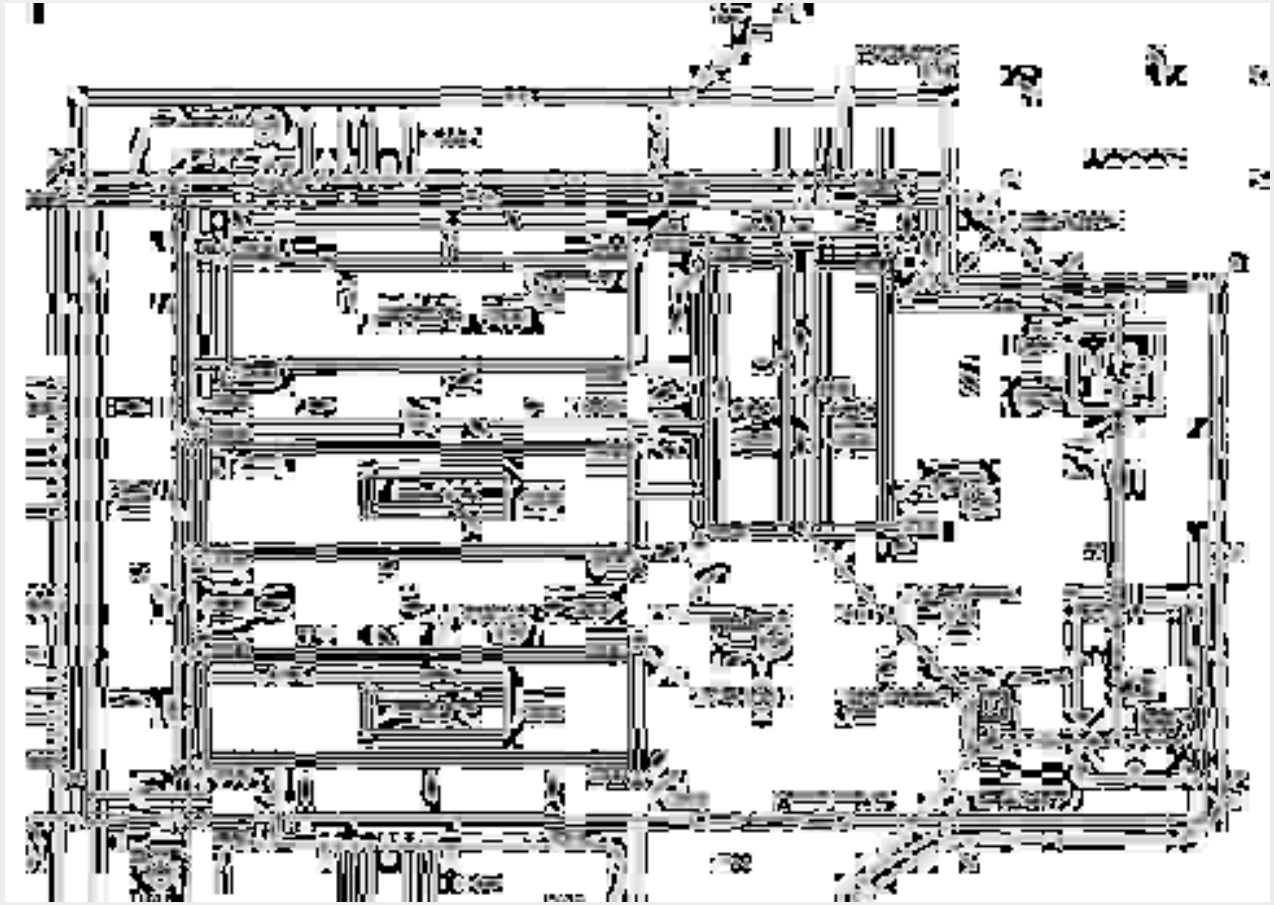
  Price: 3.8 cents/kWh of electricity produced plus operating profit before income taxes

  Option: Right of first refusal to install a second engine

Sudbury Landfill Site



Power Plant Site



Standard Offer

OEB December 2006

- Buy electricity @ 11¢ per kw for 20 yrs
  (study assumed Market Price of 8¢)
- Additional 3.52¢ incentive
  (for performance for output at peak time)
- Annual increase at CPI
- Max size: 10 MW
- GHG credits transferred to OPA
  (to accrue to the benefits of Ontario electricity consumers)

Equipment in transit

GSU/Genco

- Reciprocating engine mature technology

  Similar to diesel engines that provide electricity to northern communities

- Worldwide: > 1,000 at landfill facilities
- North America: > 250 at landfill facilities
- Canada: 9 at landfill facilities

Preliminary Landfill Gas Project Evaluation

- Revenues Original Project Evaluation:

  $50,000 - $100,000

- Revenues based on Standard Offer:

  $300,000 - $800,000*

- Revised to approximately $500,000

Note: Dependant of type of financial arrangement to finance the project.

Future Expansion

- Expand collection system as more waste is added to the landfill site.
- Potential to add more engines.
- Potential to capture more gas from anaerobic digester.