Trash to Cash- Methane Capture Generates $3-4million Annually

City
Toronto, Canada

Population
2.48 million

Project Start Date
April, 1995

Annual CO2 Reductions
LFG Combustion: 1.8 million tons of methane (collecting 85-90% of methane that would have otherwise been released into air)

Fossil Fuel Offsets: 149,000 tons of CO2 (by not having to use coal to produce electricity)

Annual Financial Savings
$3-4 million CAD in electricity sales ($36 million CAD revenue over 11 years)

Initial Investment
City of Toronto spent $12 million CAD to build gas collection system into landfill site; Eastern Power Developers spent $20 million CAD to install power plant

Project Status
Landfill has reached its maximum capacity and closed in 2002. Plant continues to operate at 24 MW

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SUMMARY

A power pant was constructed on the site of Toronto's primary waste landfill to convert captured methane gas into electricity providing power for roughly 24,000 homes.

WHAT IS IT?

Keele Valley Landfill site was Toronto's primary waste disposal facility. It is one of three landfills in which Toronto has installed piping used to collect methane gas and routed to power plants, where it is burned to create electricity.

ENERGY EFFICIENCY

Creating energy from landfill gas provides 274,800,000 kW-hr or power for roughly 24,000 homes.

HOW DOES IT WORK?

- City of Toronto selected Eastern Power Developers (EPD) to generate electricity from Landfill Gas (LFG) for sale to local power utility, Ontario Power Generation. A power plant at the Keele Valley Site was constructed and generation of electricity began in April 1995.
- City of Toronto spent $12 million CAD to build a gas collection system into landfill site. Easter Power Developers spent $20 million CAD to install power plant.
- 40,000 linear meters of horizontal gas collection trenches and 80 vertical gas collection wells were installed within the landfill waste site by City of Toronto. The Site is encircled by roughly 10,000 linear meters of dual header piping for transmission of gas from the wells and trenches to the central blower/flaring station.
- Centrifugal blowers located at the central blower/flare station apply vacuum to the collection piping to extract LFG from the trenches and wells located in the landfill.
- The collected gas is then directed to the power plant for generation of electricity.

NEXT STEPS

The landfill reached its maximum capacity and closed in 2002. The plant continues to operate. It is currently operating at 24 MW from an initial 33 MW. It will continue to operate until there is no methane gas left.

APPLICATION

- Keele Valley landfill site is in an urban setting, close to residential area.
- Site was required by city to control odor and dispose of methane emitted: this meant either directing the gas underground or releasing it into open air.
- Because methane is explosive, directing it underground was not a lucrative proposition.
- Made financial and practical sense to collect methane and utilize it as a fuel to produce electricity.
- Landfill site is close enough to electrical grid, which makes constructing a power plant there financially viable- no need for hundreds of miles of electrical wiring.

CONTACTS

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The facts and figures in this case study have been provided by the highlighted city governments to the Clinton Climate Initiative.