



Methane Landfill Capture

The University of Washington as a Case Study



The Old Montlake Landfill

Part of the University of Washington is built on the remains of an old landfill, closed in 1971. Degrading garbage is a significant source of methane. It is estimated that approximately ~6,000 metric tons of carbon dioxide equivalent (MTCO_{2e}) of methane, roughly 3% of UW's emissions, were vented from the landfill in 2005.

- Much of the area is now covered by parking lots. A passive ventilation system was installed in 2000 due to potential explosion hazards.

- Vented methane could be captured and then flared (reducing its climate change impact) or burned in a turbine or IC engine (reducing its impact while generating electricity).

Flare or Energy Source?

- Both systems would require an active collection system (blowers/fans and extended piping manifolds to central location).

- Additional fuel may be needed to raise the fuel concentration to levels required for combustion. There is not enough methane being produced to capture for use as an energy source

Select Resources

UW Climate Partnership Montlake Landfill Methane Project. Available: <http://courses.washington.edu/emksp06/uw-climate/index.html>

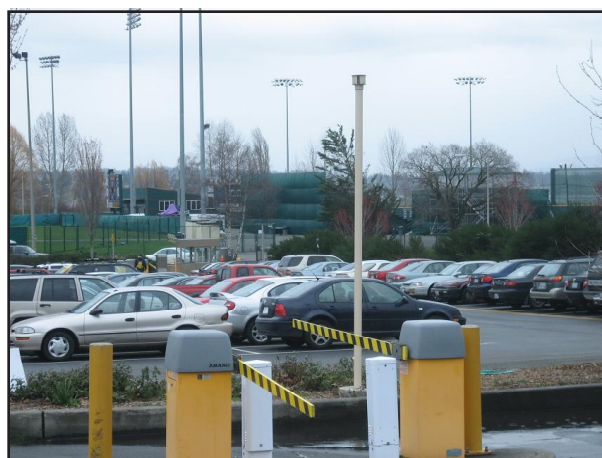
Montlake Landfill Information Summary, 1/99, Montlake Landfill Work Group

US Methane Emissions 1990-2020: Inventories, Projections, and Opportunities for Reductions, EPA

2006 Power Ratings. Available: www.waukeshaengine.com, <http://www.capstoneturbine.com/>

Lessons Learned

- Approximately \$12 per MTCO_{2e} avoided for methane flaring is a significant amount of money, but in the range of "GHG Offsets", which are available for ~\$5-25 MTCO_{2e}.
- Non-financial concerns can be major barriers to project implementation. For example, there may be concerns regarding community safety and aesthetics.
- Their are potentially large educational benefits to the UW community about climate change and climate mitigation action from this highly visible project.
- Implementing is a potential student/faculty research project is an opportunity that should be explored.



The white collection vent behind the gates is an example of one of 41 total vents on top of the old Montlake landfill. Anaerobic bacteria decay the waste, creating "landfill gas", which is 55% methane (CH₄) by volume. Methane is a much more potent GHG than CO₂, more than 20 times more efficient in its global warming impact.

Next Steps

- Explore other unconventional technologies with added environmental benefits: Organic Rankine Cycles using microbial digestion, Large Stirling Engines with modified flare as heat source.
- Delve deeper into benefit of tax credits, subsidies, or other aid based benefits to bolster system economics.
- Get vendor quotes on appropriately sized systems.