

TRASH TO TREASURE: Efficient Energy Production with Microturbines



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PROBLEMS

Wastewater

The substantial amount of methane produced by Riverhead Waste Water Facility is used inefficiently

Instead of using it for energy production, it's simply burned to heat the anaerobic digestors

Landfills

In Robin Hood Bay Regional Waste Management Facility captures methane but instead of harnessing it for power, the methane is just flared—burnt off into the atmosphere.

Not only wasteful but also contributes to greenhouse gas emissions.

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Microturbines

Micro-turbines are tiny gas turbines that can generate both electricity and heat.

They can use biogas such as Methane as fuels.

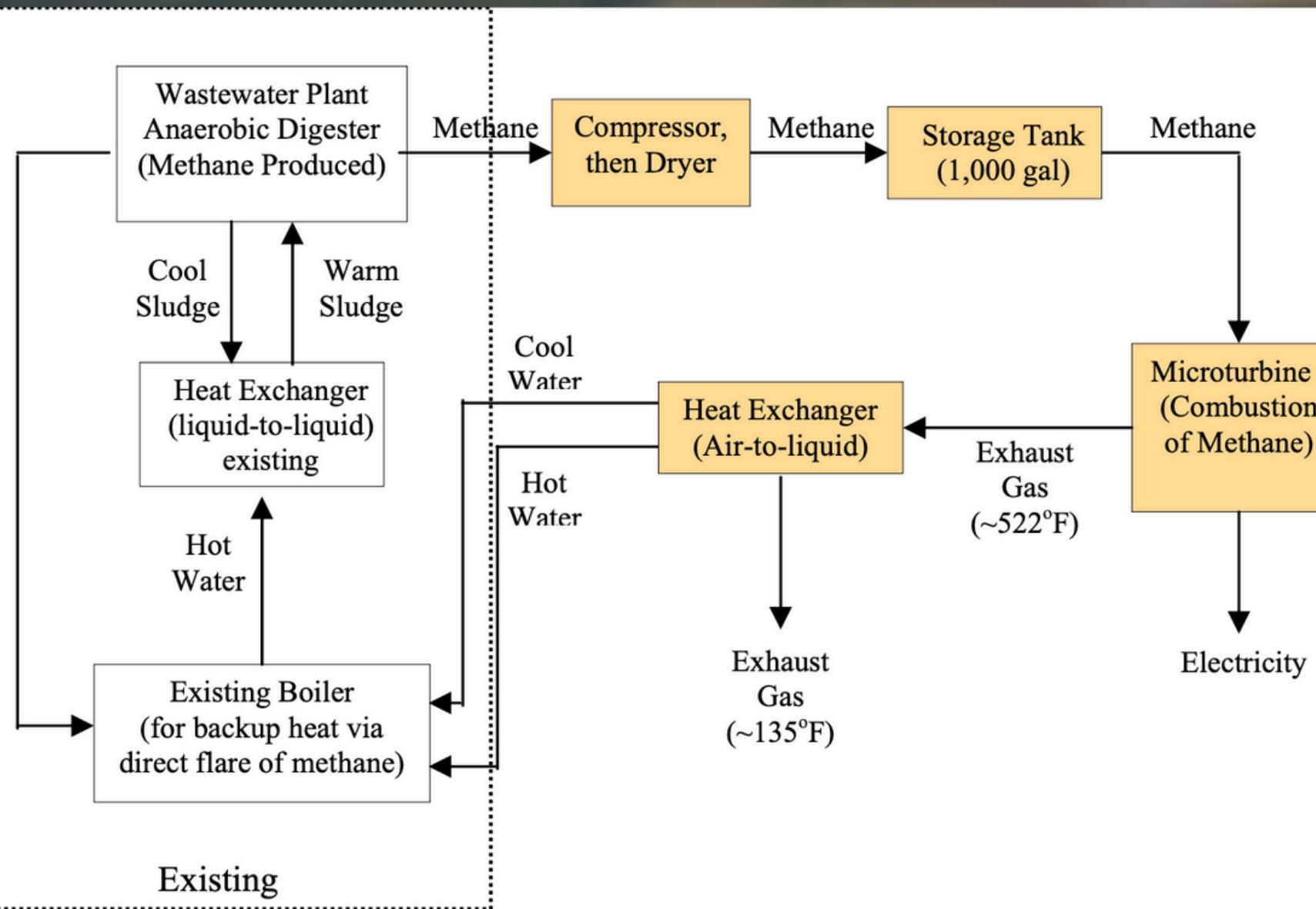
More feasible than producing biofuel from organic waste

They are easy to handle and have relatively low emissions so they can be considered “clean”.



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SOLUTION



- Anaerobic Digestion to Produce Methane
- Gas Collection and Storage
- Methane Purification
- Microturbine Combustion of Methane
- Electricity Utilization

CASE STUDY

- Installed two 30 kW microturbines to generate electricity from waste methane produced during anaerobic digestion.
- The system saves approximately 450,000 kWh annually, reducing electricity costs by \$43,000 per year.
- 80% system efficiency from combined electricity generation and waste heat utilization.
- The project reduced more than 600,000 pounds of CO₂ emissions annually by capturing and using methane, a potent greenhouse gas.
- Methane is now almost 100% utilized, compared to only 50% usage before the project.

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COST

	Pre-Construction (estimates)	Post-Construction (actuals)
System capital cost	\$184,000	\$303,000
Incentives	\$25,000	\$80,000
Net customer cost	\$159,000	\$223,000
Electric generation	396,000 kWh/yr	480,000 kWh/yr
Electric cost savings	\$26,600/yr ⁵	\$44,000/yr ⁶
Maintenance costs	\$3,700/yr	\$4,000/yr
Net annual savings	\$22,900	\$44,000
Payback without incentives	8.0 yrs	5.6 yrs
Payback with incentives	6.9 yrs	3.6 yrs

- 480 000 kWh/yr can power 32 homes in NL
- St. John's water treatment plant has an average flow of 35.6 MGD
- 17x more than the Essex Junction Facility
- Possibly scalable to 8 000 000 kWh/yr
- Electricity usage of St. John's is around 100 000 000 kWh/yr

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References

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Scan the QR code to explore more on our website

*Thank
you!*



Questions or Thoughts?

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