ENER-CORE

Presentation at Biogas Technology Advisory Committee Meeting 10/29/2014 OTCQB: ENCR

October 2014

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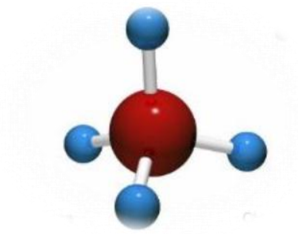
Oxidation: A Natural Process

Oxidation occurs when a substance comes into contact with oxygen molecules—almost everything, over time, reacts with oxygen…

However, in nature, oxidation is a very slow process.



Ener-Core **accelerates** the oxidation of methane to 2-3 seconds!

"1.5% - 2.5% methane as fuel"

Methane (in atmosphere)
10-20 years

Sterling Silver
2 weeks

Banana
5-7 days

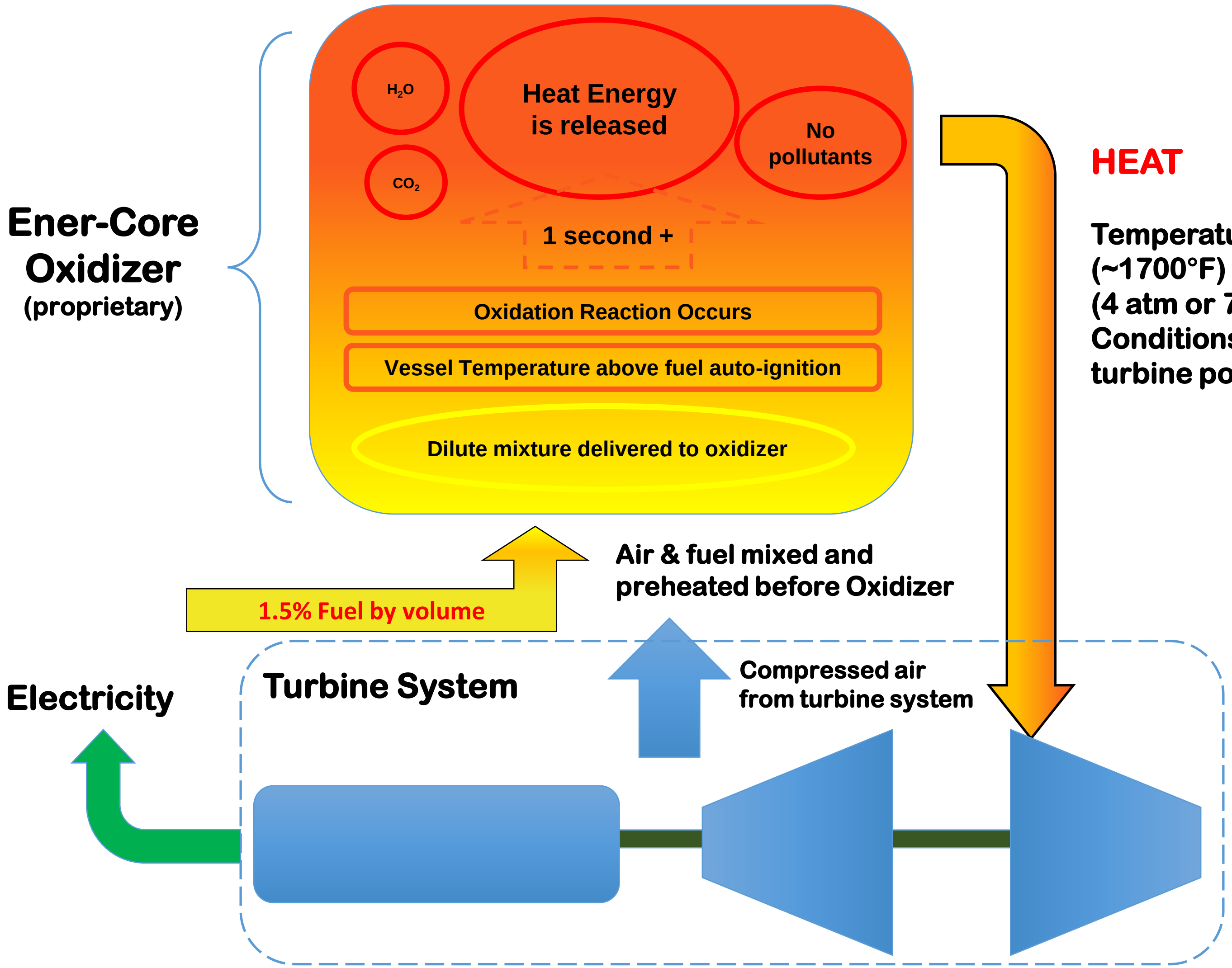
Ener-Core
2-3 seconds!

How the Technology Works

The dilute gas (input) does not have a high enough energy content for combustion.

Combustion is a rapid reaction that happens in milliseconds and produces pollutants as part of output.

Ener-Core Oxidation is an exothermic chemical reaction. It has no flame, resulting in temperature that avoids the NOx formation temperature. It happens in seconds, it produces heat, and it removes the pollutants in the Incoming gas.



Company Timeline

Ribbon Cutting Video

http://youtu.be/lFUWRoZ9bMA?list=UUrc1RqrzUktjFXA13reumbQ

$25M Invested by Venture Capital

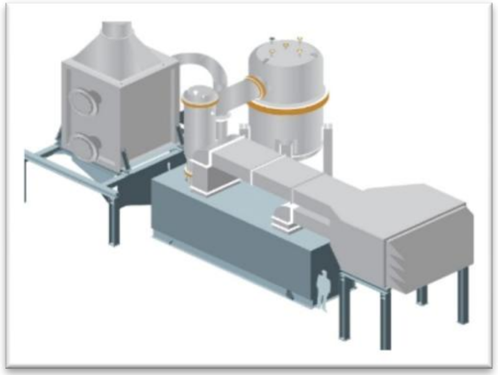
2008 - 12

Successful 1-year Operation on Dept. of Defense Landfill

2011 - 12

1st Commercial unit commissioned and operating in field

2013-14



Scale-up & Commercially License to large turbine manufacturers

2015

Technology evolves from prototype to market deployment

Ener-Core goes public and ships 1st commercial system

250 kW Ener-Core Powerstation

FP250 (250 kW)

Gas Energy Input: 3.6 MMBtu/hr (1042 kW)

Electric Output: 250 kW

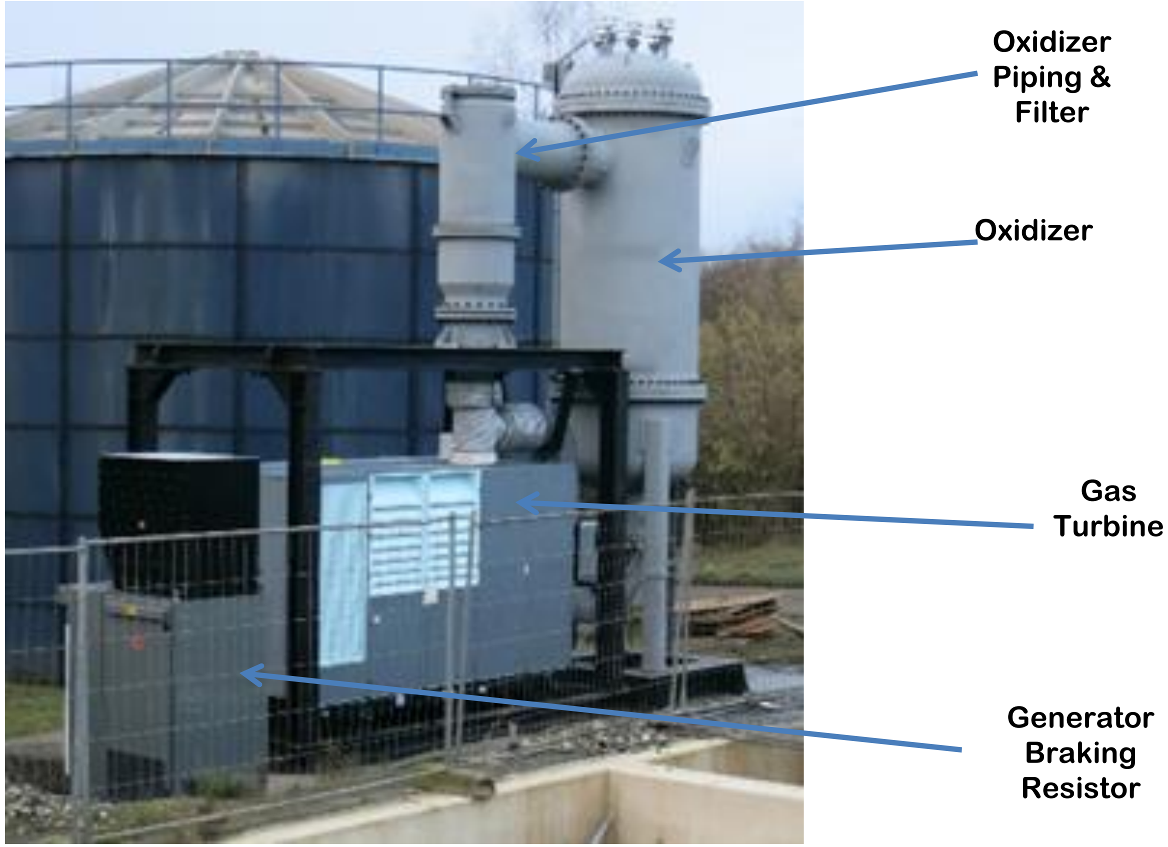
Electrical Efficiency: 26% (LHV)

Minimal Fuel Conditioning

Siloxane Removal Not Required

H2S tolerant (up to 6500 ppmv)

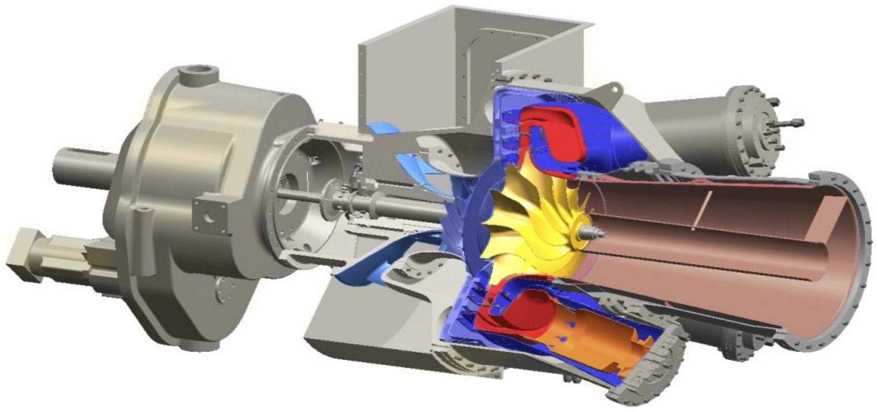
NOx Emissions < 1 ppmv (no catalyst)



FP250 at Schinnen Landfill

Robust Reliable Dresser-Rand KG2-3G Gas Turbine

- All Radial; Single Shaft
- Cold End Drive
- Capacity: 2 MW ISO Shaft
- Efficiency : 25%



- KG2-3G Off Base Combustor
- Standard Configuration
- Flanges for Oxidizer Interface

KG2-3G/GO Configurations: Simple Cycle and Recuperated

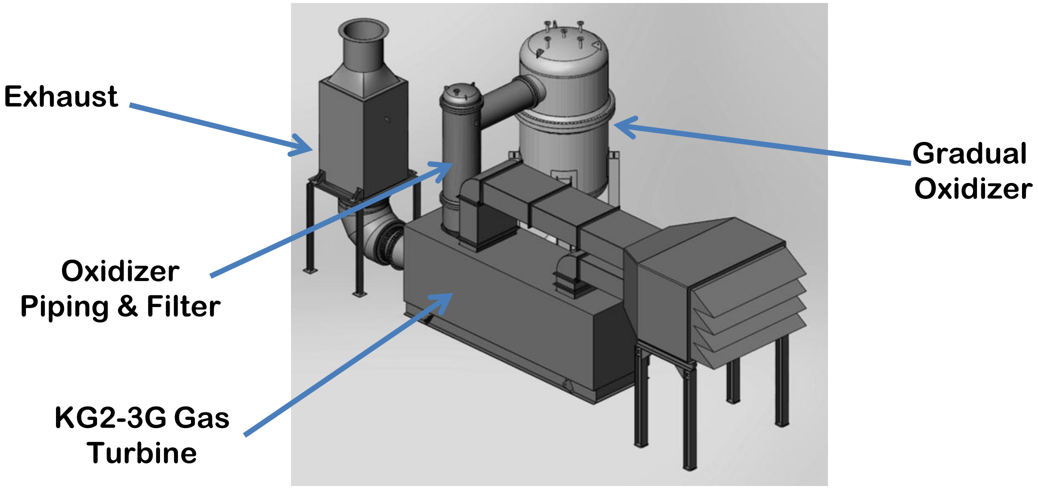
Simple Cycle KG2-3G/GO (High Exhaust Heat)

Gas Energy Input: 25 MMBtu/hr (7300 kW)

Electric Output: 1750 kW

Steam Output: 12,667 lb/hr (3804 kW)

Overall efficiency: 76% (LHV)



Simple Cycle KG2-3G/GO
(w/o Recuperator)

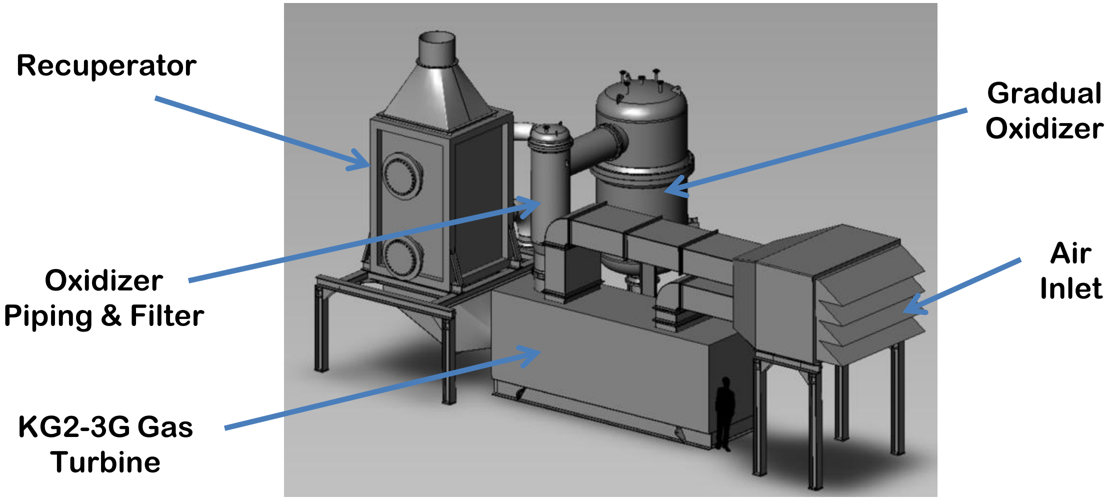
Recuperated KG2-3G/GO (High Electrical Efficiency)

Gas Energy Input: 17 MMBtu/hr (5000 kW)

Electric Output: 1750 kW

Electrical efficiency: 35% (LHV)

Overall efficiency: 70% (LHV)
(with 6 MMBtu/hr of hot water)



KG2-3G/GO with Recuperator

Minimal Fuel Conditioning; No Siloxane Removal Required; H2S up to 15,000 ppmv

Fueling Strategies

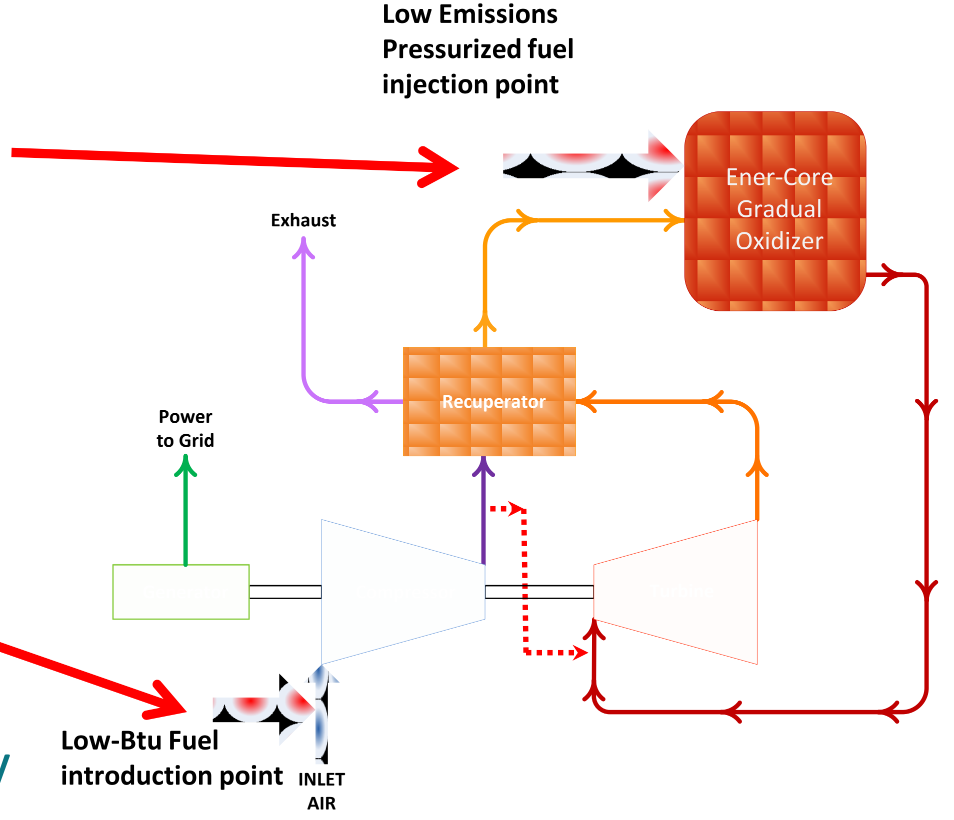
If 30% to 100% CH_4

- **Ultra Low Emissions-** Injected prior the Oxidizer

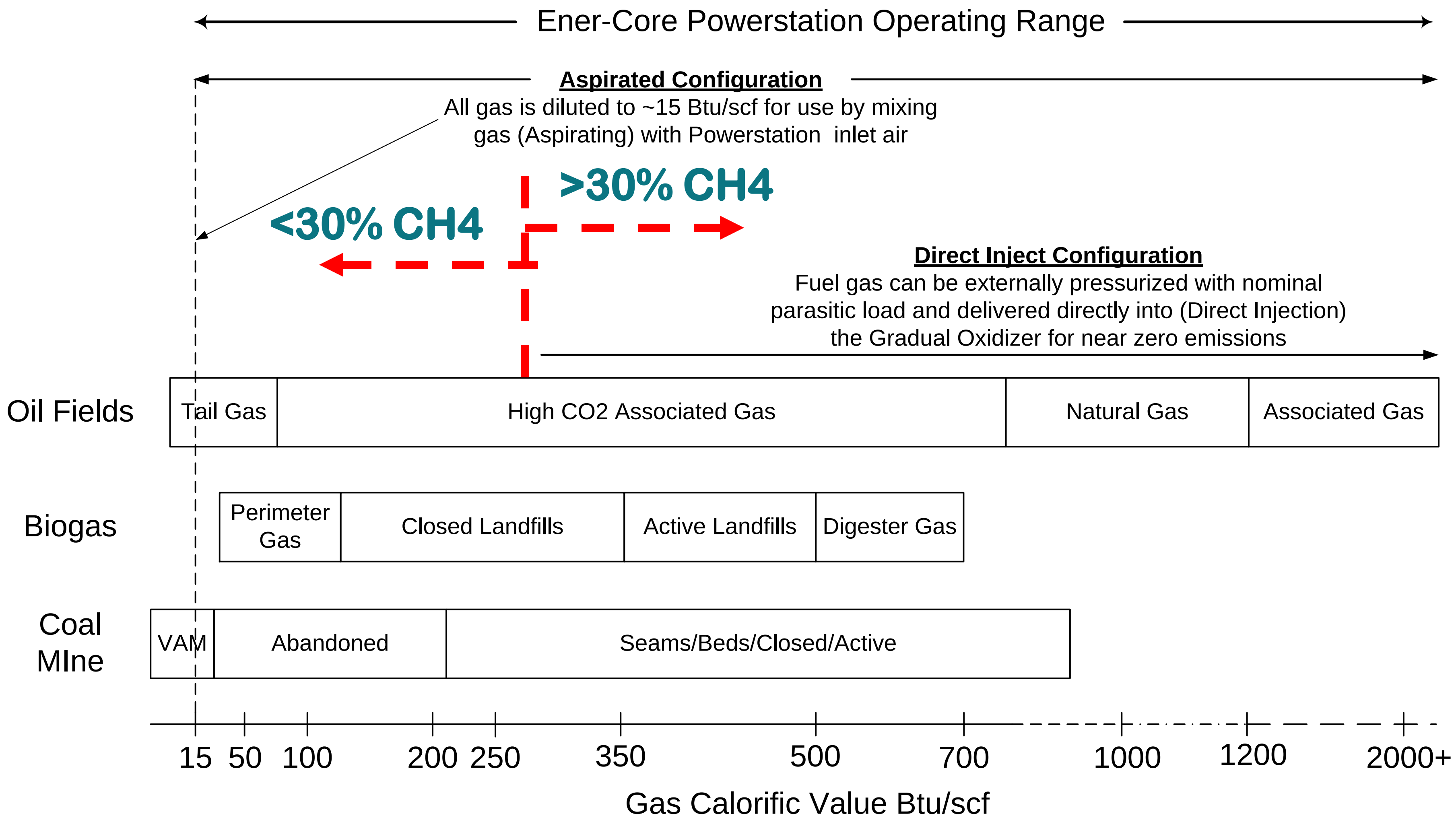
If < 30% CH_4

- **Low BTU** fuel can be introduced directly into the compressor inlet

- Independent of the strategy NO_x < 1ppm



Two Product Configurations for Site Gas Use Solution



Fort Benning 3rd Party Emissions Test Summary

Stationary Source Sampling Report
Flex Powerstation™, Fort Benning, GA

Report Date: November 7, 2012
Integrity Air Project No. 12-070

2.0 RESULTS

This section presents the sampling results in tabular form. Detailed sampling results and example calculations for the test program can be found in Appendix 1.

2.1 Summary of Results

Table 3 presents a summary of the results from the sampling performed at the Flex Powerstation™ inlet and exhaust on October 17, 2012.

Table 3 - Summary of Results – Flex Powerstation™, October 17, 2012

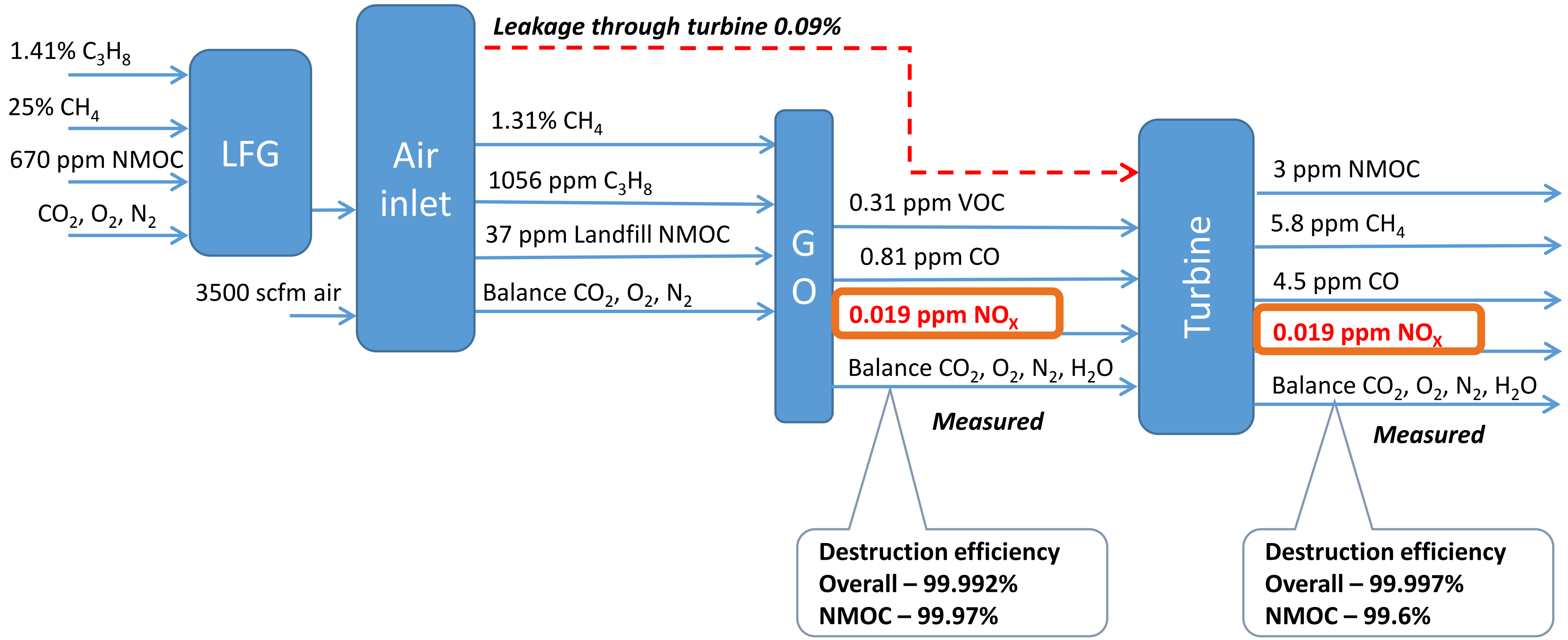
Run	1		2		3		Avg.	
Time	0757-0856		0916-1015		1034-1133		---	
Sample Location	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Sulfur Dioxide ppmvd lbs/hr		0.61 0.023		0.17 0.007		0.06 0.002		0.28 0.011
Nitrogen Oxide ppmvd lbs/hr		0.019 0.00052		0.019 0.00052		0.019 0.00052		0.019 0.00052
Carbon Monoxide ppmvd lbs/hr		4.51 0.076		4.53 0.077		4.40 0.074		4.48 0.075
TRS ppmvd lbs/hr		0.316 0.011		0.209 0.008		0.105 0.004		0.210 0.008
Total Particulate Matter lbs/hr		0.043		0.030		0.036		0.036
NMOC as Carbon† lbs/hr	12.7	0.054	10.8	0.052	11.4	0.044	11.6	0.050
NMOC as Carbon DE‡, %		99.6		99.5		99.6		99.6

† NMOC = VOC minus methane.
‡ DRE = ((inlet lbs/hr – outlet lbs/hr) / inlet lbs/hr) * 100.

- **Test Date**: October 17, 2012
- **Emission Tester:** Integrity Air who was selected by Southern Research Institute
- **Configuration:** Aspirated configuration where gas is sprayed into inlet of gas turbine.
- **Results Summary**: Low NOx achieved. CO and NMOC levels were impacted by leakage flow which bypasses oxidizer.
- **Leakage flow:** Originates in compressor then flows to the turbine seals. It is not processed by oxidizer, thus raising CO and NMOC emissions.

Ft Benning Landfill Low Btu - Aspirated

Certified Test Data Summary from Ft Benning Project



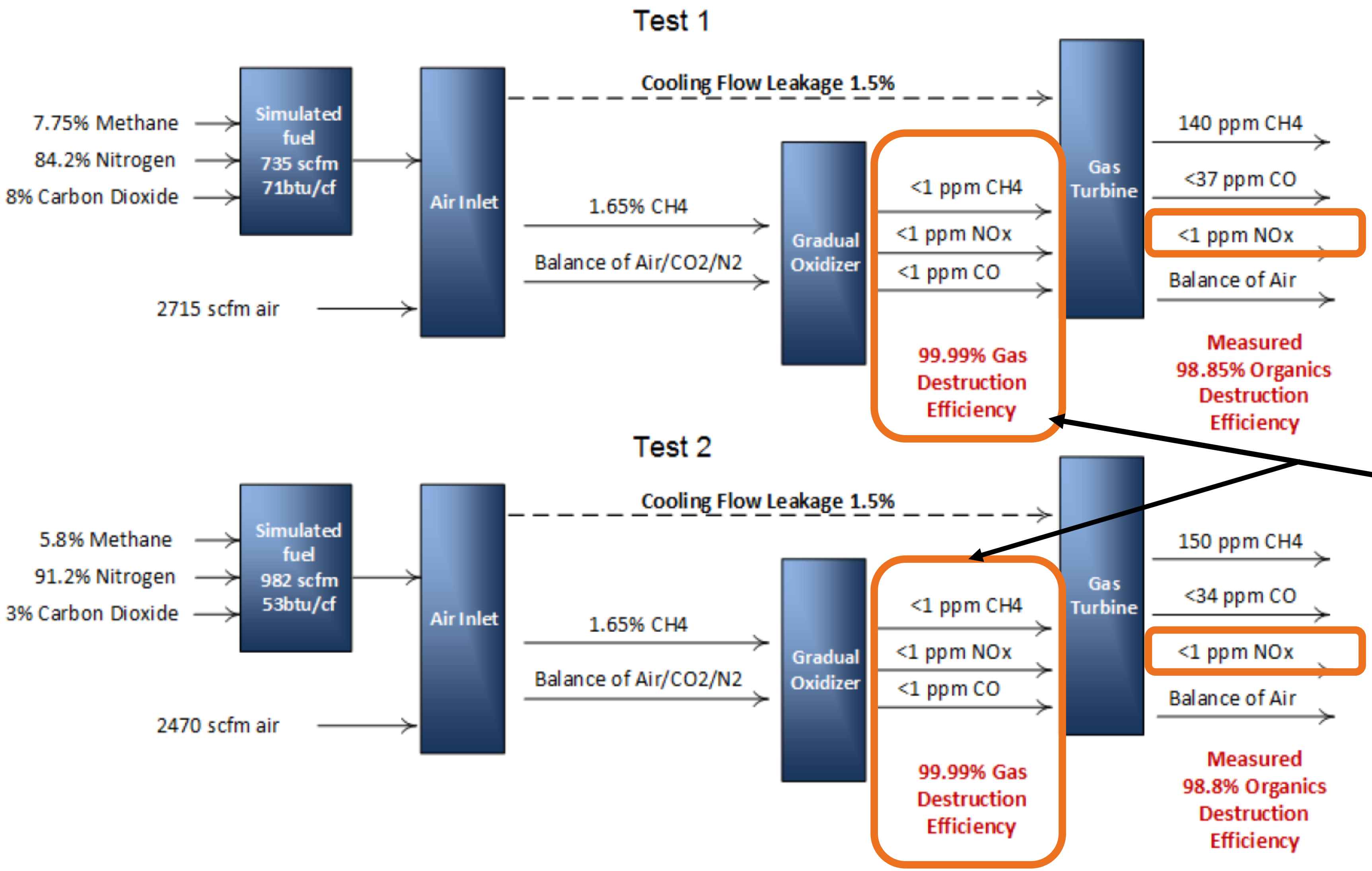
Ultra-Low Btu Test for Oil & Gas Customer

- Customer is interested in utilizing Ener-Core's Oxidation technology to generate clean power from a casing gas emitted during a proprietary in-situ combustion oil extraction process
- The purpose of the project was to test a simulated low BTU fuel (~75 BTU/scf) with the Ener-Core test unit

	1st Condition	2nd Condition
Methane (CH_4)	7.75%	5.80%
Nitrogen (N_2)	84.20%	91.15%
Carbon Dioxide (CO_2)	8.00%	3.00%
LHV (Btu/scf)	71	53
Steady run time (hr)	5.5	3

Ener-Core Test Machine at UC Irvine Campus

Ultra-Low Btu Test Emissions Sampling Results



Expected Emissions for Direct Inject (Low Emissions) configuration

Attero Landfill – Schinnen, Netherlands

- Closed landfill with below 30% methane; past problems with reciprocating engines running inconsistently and unable to run on gas
- First Commercially sold unit
- 250kW oxidizer powerstation was successfully installed and is currently operating continuously
- 250 kW oxidizer powerstation generates about 50% more electricity (kWhs) per week than reciprocating engine it replaced
- Has accrued over 1500 hours since commissioning in 2014

FP250 at Schinnen Landfill

Watch our Whiteboard video explaining the gradual oxidation process and its applications

https://www.youtube.com/watch?v=YIwJNOF-SQU