Lean Gas To Power

Green Power Generation

ECOSPRAY
technologies for the planet

Lean Gas To Power - LG2P

Overview

- Suitable for all lean gas from landfill CH_4 as low as 1.5%.
- 130 kWe production (with only 50 Sm^3/h of methane diluted in about 4000 Sm^3 of stream).
- 340 kWt production @ 240°C.
- Proprietary advanced oxidized catalyst, requiring no regeneration for 8000 hr.
- Standard 40 feet container layout.
- Off-gas can be oxidized to reduce methane slip.

Main Features

- Turn waste into a resource while preventing GHG emissions.
- Enhance the value of low-methane concentration landfills.
- Obtain dual benefits by exploiting wastes: removing pollutants and energy generation.

Benefits

Eliminate a greenhouse gas (after oxidation, the CH_4 content is < 0.2%).

Avoid any combustion by-products (NOx, SOx) due to low temperature oxidation.

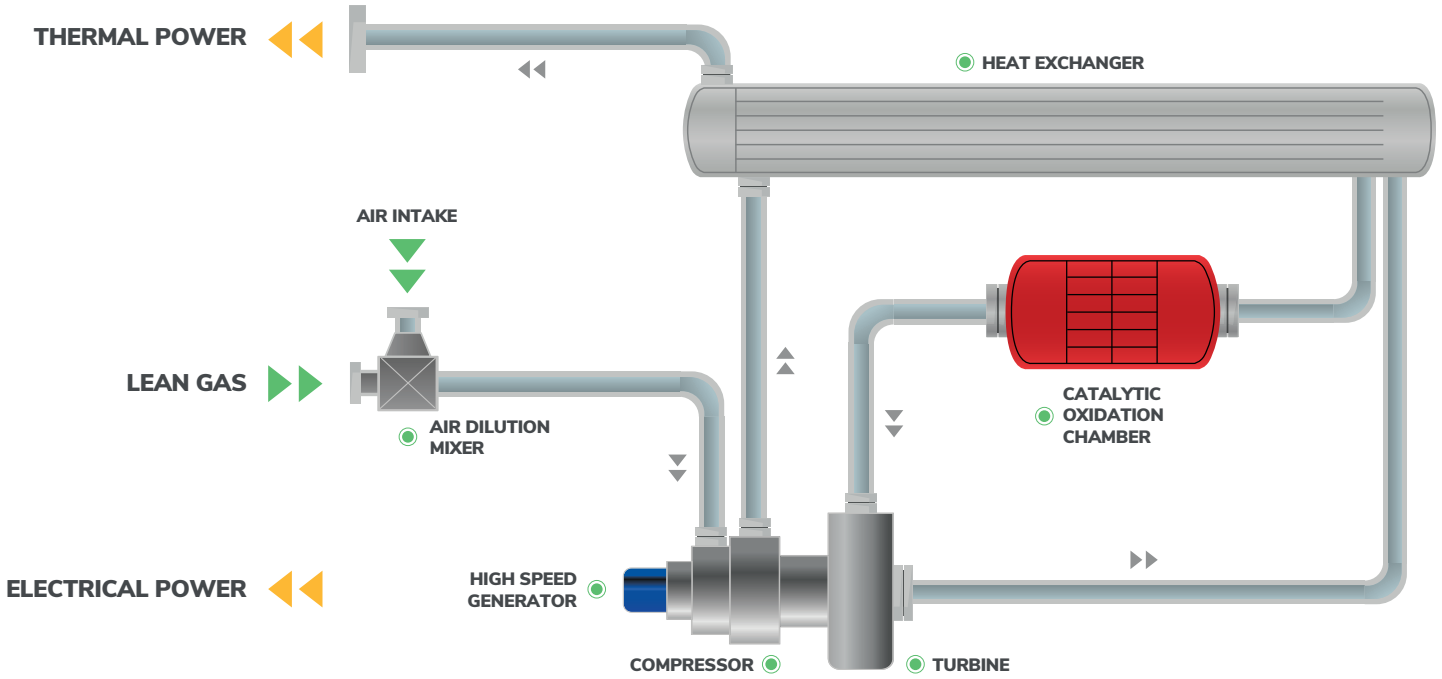
Save cost and footprint vs. biofilters (several times larger than our 40-ft container footprint).

Recover from landfill all possible gas by suction.

Turn waste into a valuable resource instead of paying for its disposal.

Support the sustainability of the landfill and help the environment with an effective decarbonization.

How It Works



1

Gas is collected by suction from the landfill, avoiding any leakage of greenhouse gas and exploiting all the methane available thanks to vacuum.

2

The compressed stream is sent into the catalytic chamber for oxidation (750/800 °C - negligible NOx/SOx).

3

The re-heated flow passes through a turbine directly connected with the high-speed generator to produce power.

4

The exhaust gas is sent to a heat exchanger to generate thermal power.

Mass Balance

Typical composition of a lean gas (CH_4 <10%). Other compositions can be treated.

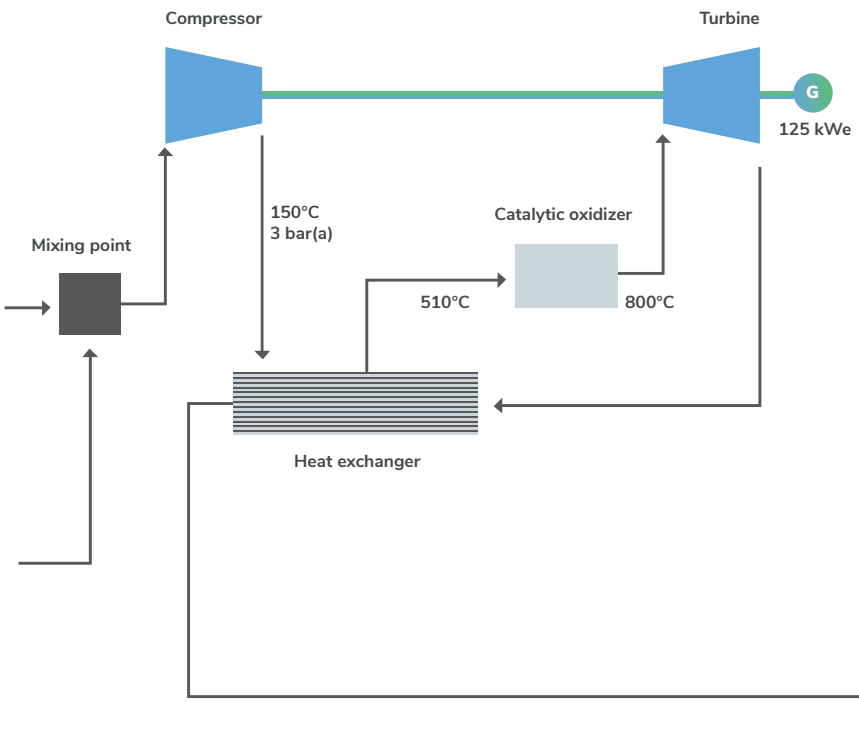
Off-Gas / Lean Gas

Flow rate	500 Nm³/h	100,0%
CH_4	50 Nm³/h *	10,0%
CO_2	300 Nm³/h	60,0%
O_2	25 Nm³/h	5,0%
N_2	125 Nm³/h	25,0%
Temp.	20°C	
Press.	1 bar(a)	

* Nm3/h of CH_4 refers to the methane content needed to obtain the maximum electric power (125 kW). Lower CH_4 contents can be also treated (the power production proportionally decreases)

Dilution Air

Flow rate	3.500 Nm³/h	100,0%
O_2	735 Nm³/h	21,0%
N_2	2.765 Nm³/h	79,0%
Temp.	20°C	
Press.	1 bar(a)	



Exhaust Gas

Flow rate	4.000 Nm³/h	100,0%
CH_4	5 Nm³/h	0,12%
CO_2	345 Nm³/h	8,63%
O_2	670 Nm³/h	16,75%
N_2	2,890 Nm³/h	72,25%
H_2O	90 Nm³/h	2,25%
Power	340 kWt	
Temp.	240°C	
Press.	1 bar(a)	

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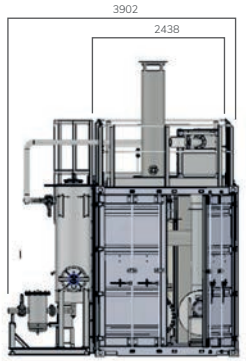
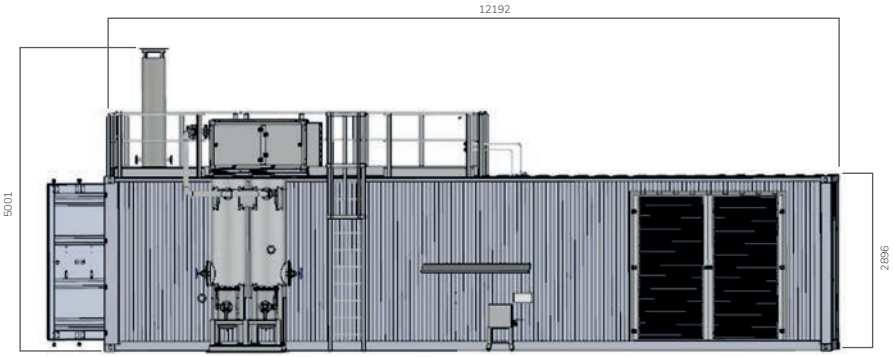
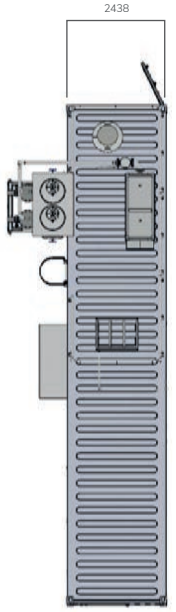
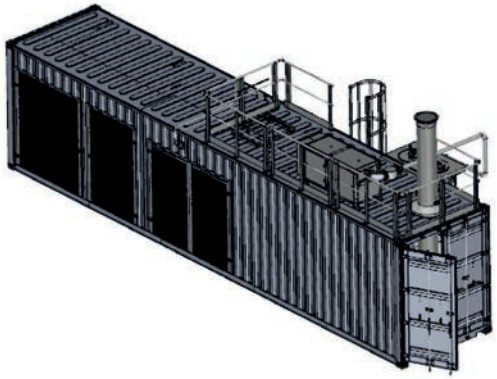
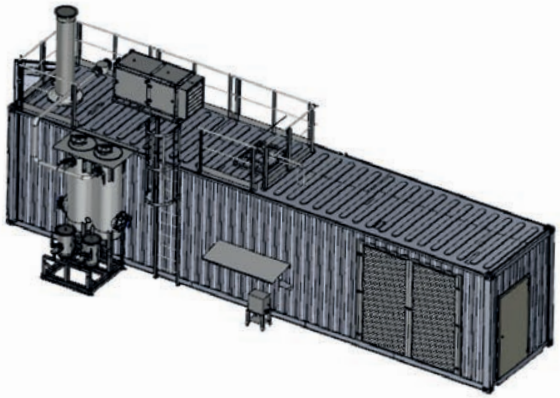
System Design











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Technology Map

Exhaust Gas Cleaning

Advanced DeSOx

Exhaust Gas Cleaning Systems
Smart Scrubber
Wet Technology
Dry and Semi-Dry Technology

Catalytic Abatement

DeNOx SCR
Catalytic Dry Filter
Methane Slip Reduction
Water Fuel Emulsion

Filtration

Wet Electrostatic Precipitator
Diesel Particle Filtration
Baghouse Filters
Filter Cassettes

Clean Fuel

Pre-Treatment and Upgrading

Pre-Treatment
Smart Blending
Biogas Upgrading
Nitrogen Rejection Unit

Liquefaction

Methane and Biomethane Liquefaction

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Decarbonization

Carbon Capture Utilization & Sequestration

Fuel Cell

Carbon Friendly Fuel Cells

Air and Water Treatment

Advanced Water Filtration

Wash Water Filtration

Sanitization

Air and Surface Sanitization

Fogging

Fogging

Gas Cooling

Gas Cooling

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