



Transforming Methane into a Sustainable Solution for Canadian Landfills

SWANA Niagara 2024



wagaBOX

Who Are We?



Headquartered in France with subsidiaries in the **USA**, Canada, Spain, UK, and Italy



Publicly listed on the Euronext Stock Exchange with a strong financial backing



Inventors of the **WAGABOX®**, a breakthrough technology in landfill gas upgrading



20 WAGABOX® facilities in operation, **15** more under construction



200+ landfill gas to energy experts worldwide



Driven by an absolute **dedication** to the **safety** of our employees and partners

We are engineers, entrepreneurs, and environmentalists committed to mitigating climate change for future generations.



Renewable Natural Gas: The best solution to replace fossil fuels

1

Renewable energy

The production of RNG reduces GHG emissions and replaces fossil fuels

Methane is **80x** more potent for global warming than CO₂ over 20 years

2

Abundant and available

Significant potential to produce biomethane from landfills is largely untapped:

20,000 landfills worldwide

3

Existing infrastructure

Transport and consumption supported by the existing infrastructure

Can be **directly injected** in the existing grid

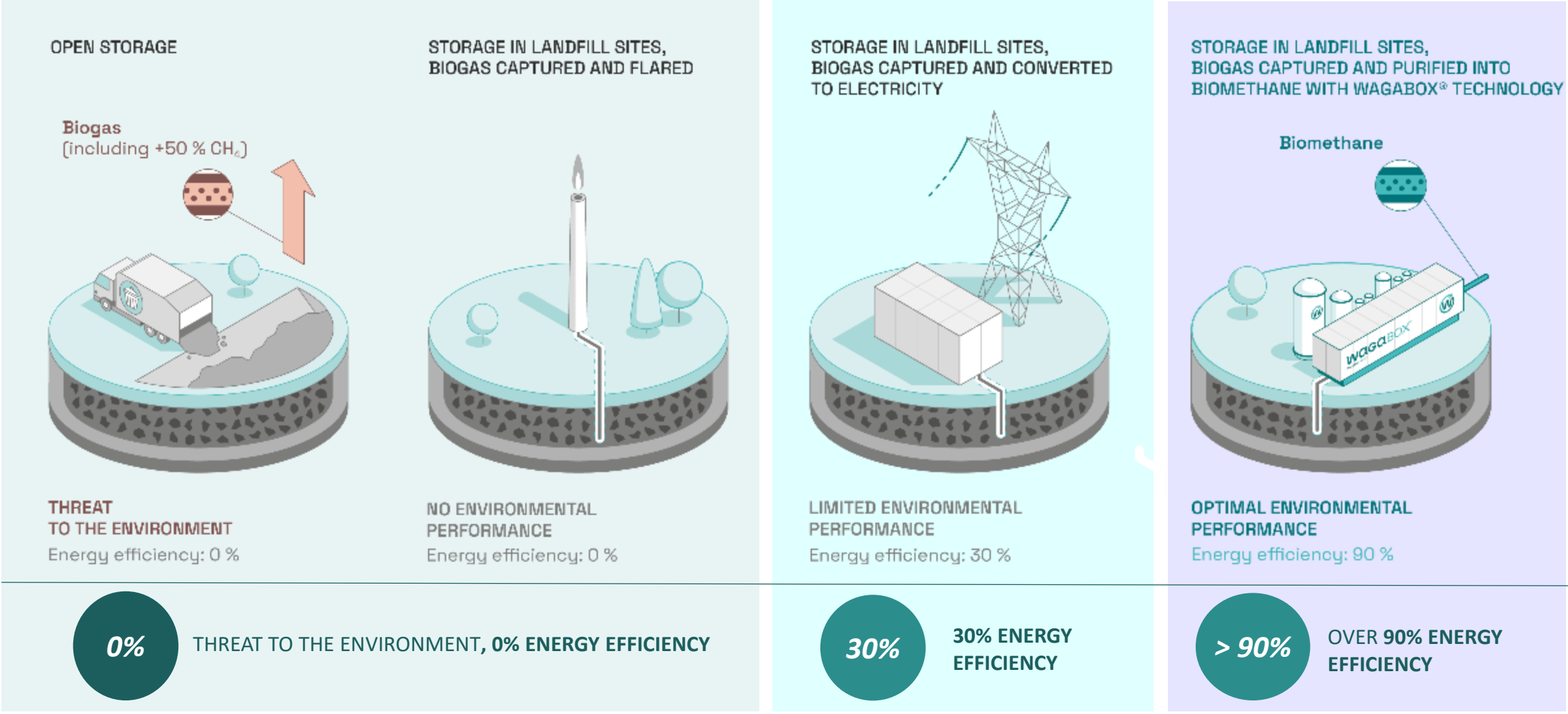
4

Equally distributed worldwide

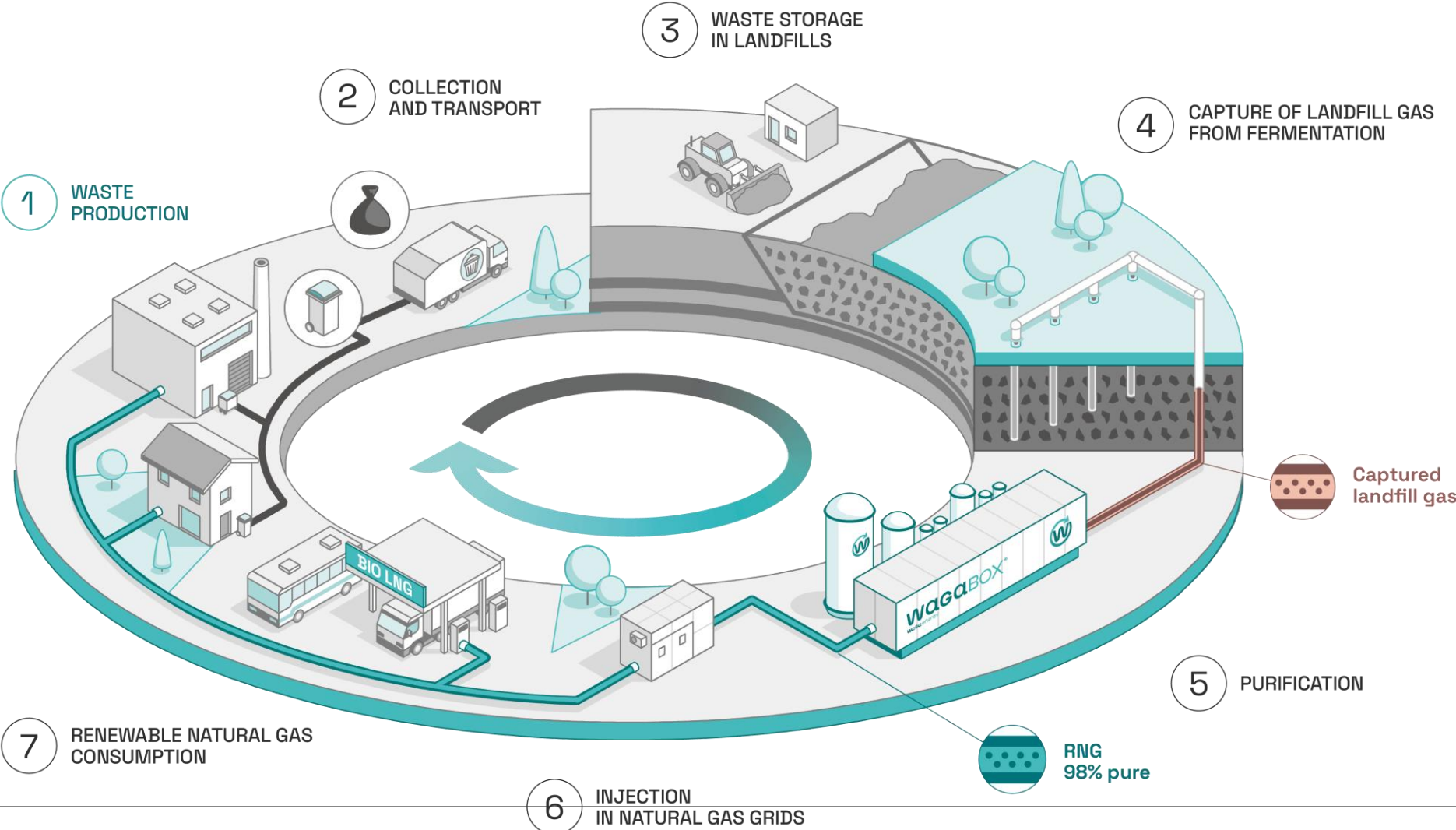
Helps developing countries to improve waste management

Reduces energy imports and geopolitical dependence

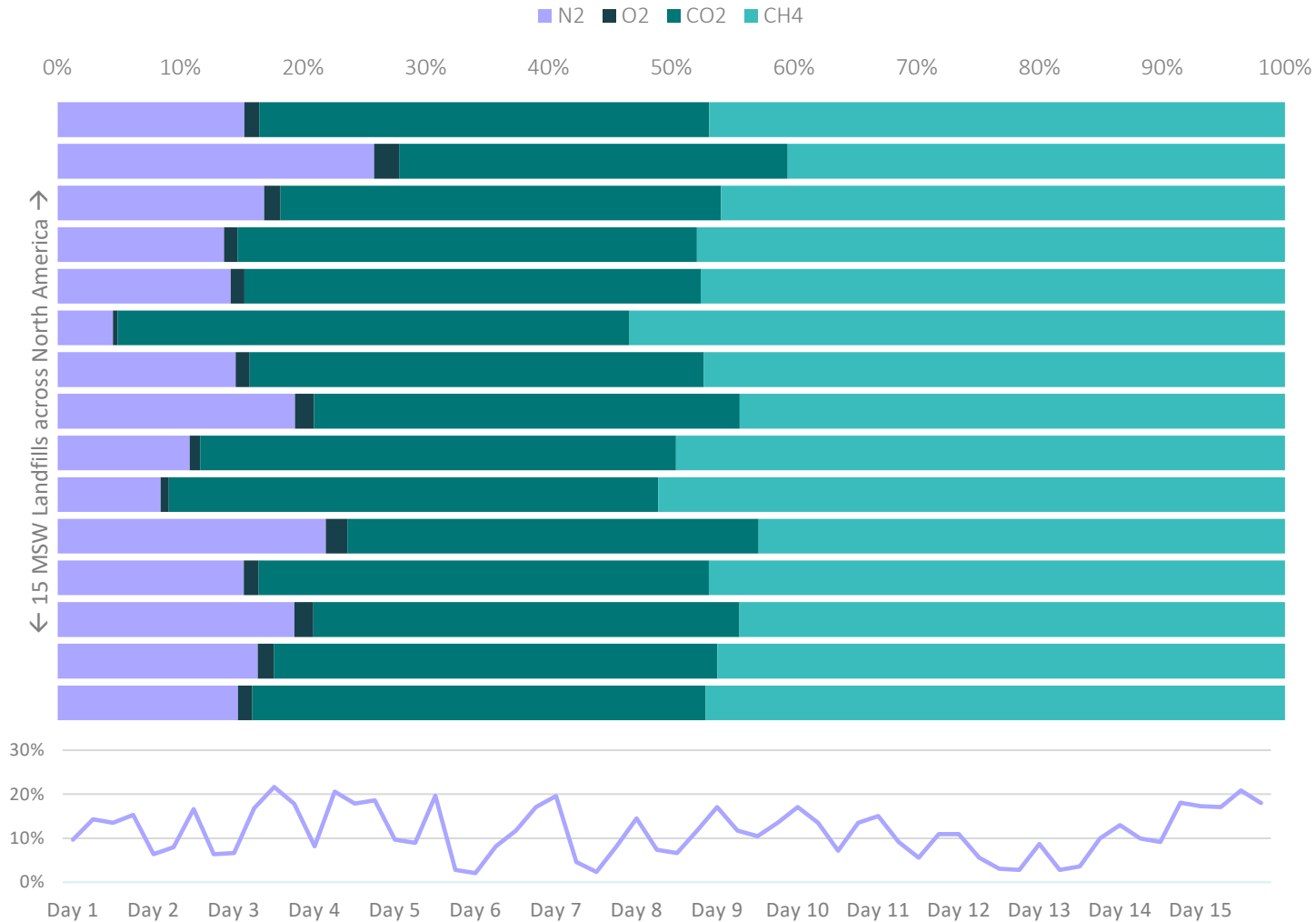
Landfills: Where RNG potential is still largely unexploited



Producing RNG on landfill sites is a short, sustainable, and value-creating virtuous circle



Upgrading LFG into RNG is a Technological Challenge



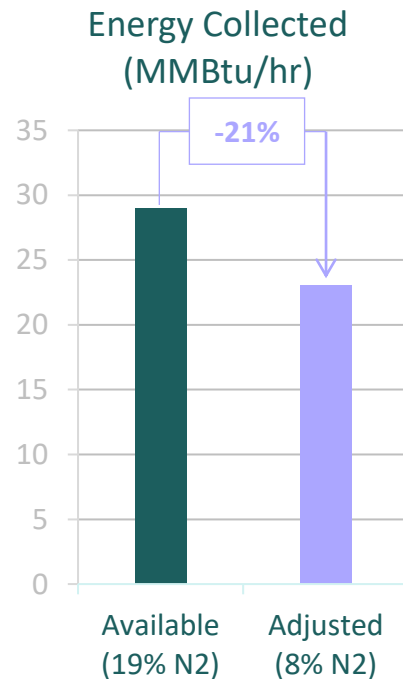
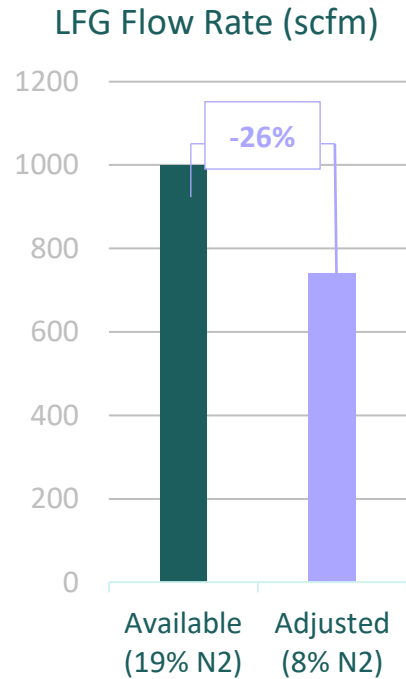
Source: Waga Energy

- Landfill gas is mainly composed of CH4, CO2, N2 and O2.
- Landfill gas composition is **unique to every site** and **varies** over time depending on waste type, site operation and atmospheric conditions.
- Legacy upgrading technologies are **highly sensitive to N2** and often require **restricting the vacuum** on the gas collection system.
- Restricting vacuum leads to **odors, surface emissions** and a **loss in energy** recovery from the waste mass.

Selecting an upgrading technology based on its ability to efficiently remove nitrogen is key to your RNG project long-term success

1. Maximizes Landfill Gas Collection

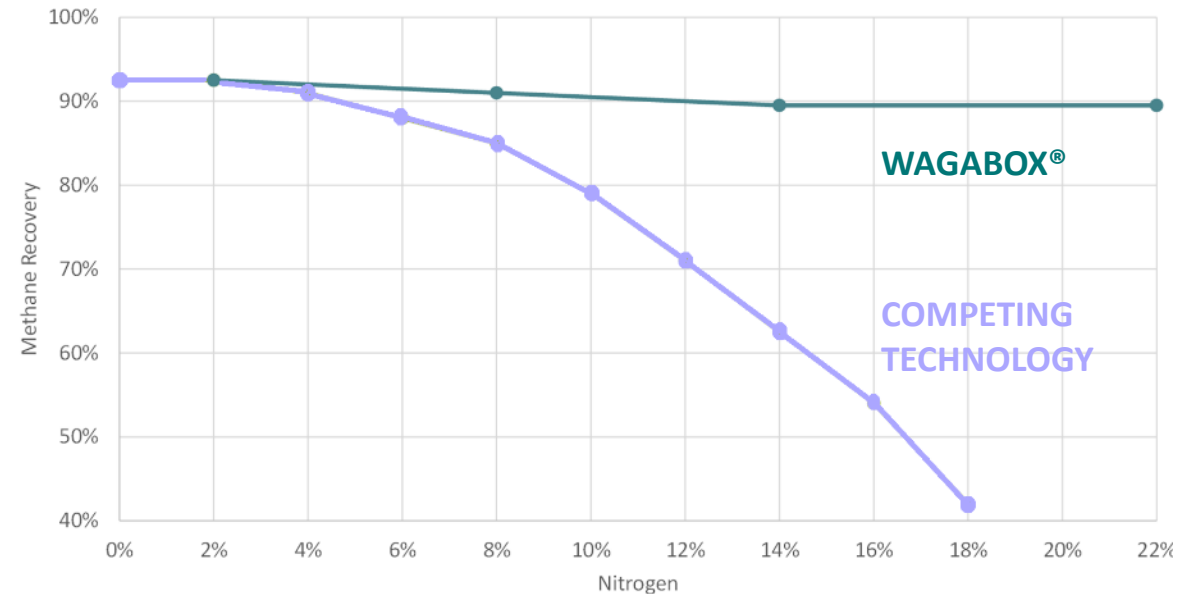
- ✔ Increases energy collection
- ✔ Reduces surface emissions
- ✔ Avoids odor complaints



Source: EPA LMOP

2. Guarantees the Highest Energy Production

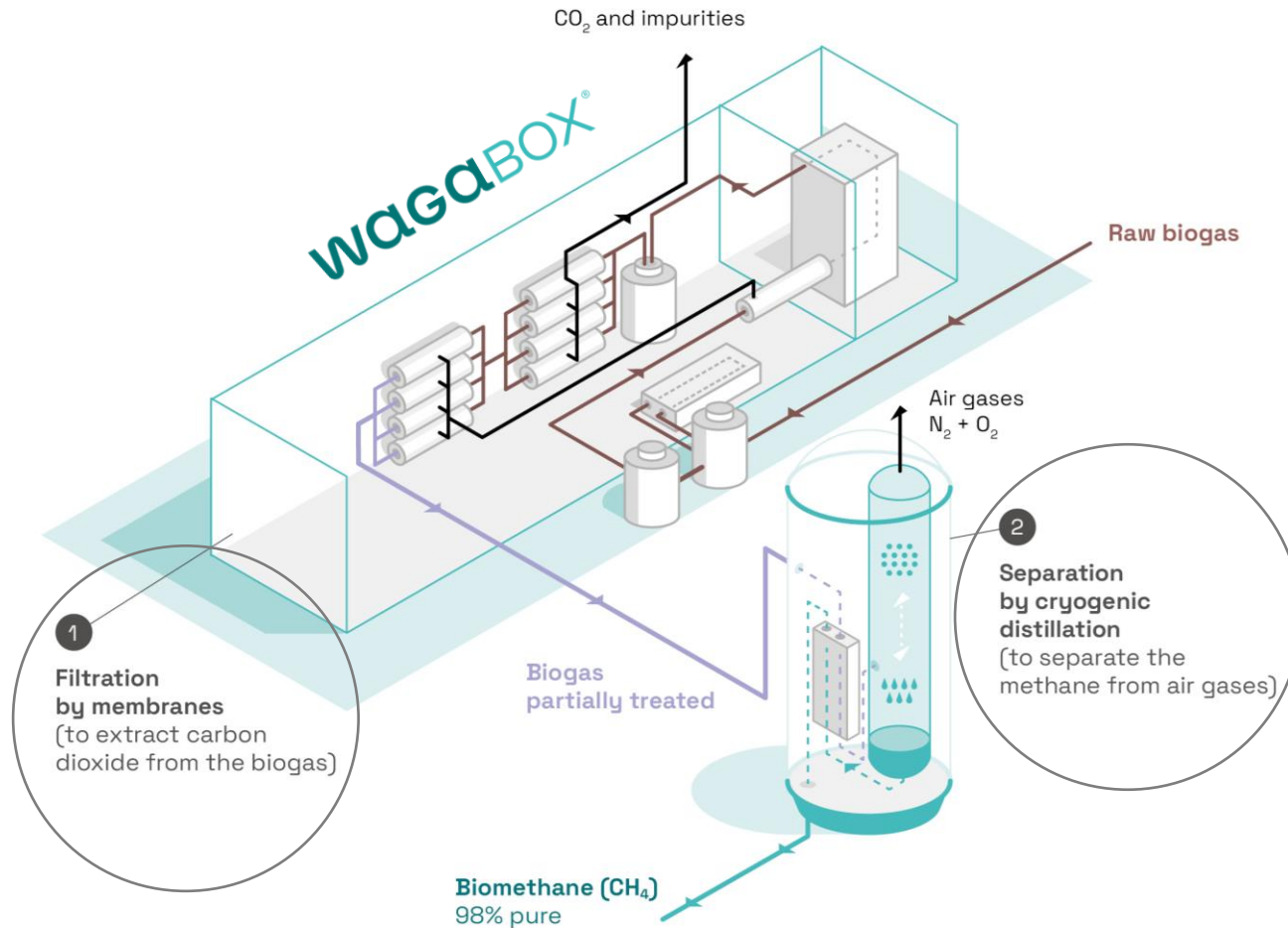
- ✔ Generates highest revenues
- ✔ Reduces OPEX
- ✔ Meets injection specification



Source: Waga Energy internal calculations

WAGABOX[®], a proprietary technology to upgrade landfill gas into RNG

WAGABOX[®] is the only standardized solution adapted to all landfill sizes and gas composition



2
patented processes

15+
years of R&D

>90%
of methane recovered

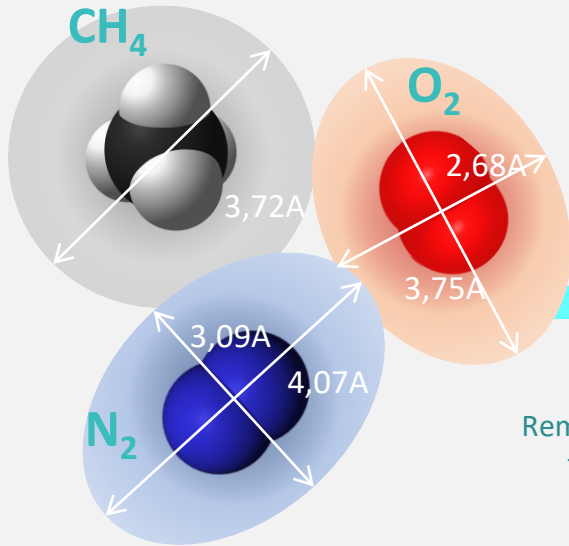
>95%
equipment availability

>98%
methane content
(grid compliant)

Up to 30%
air tenure processing
capacity

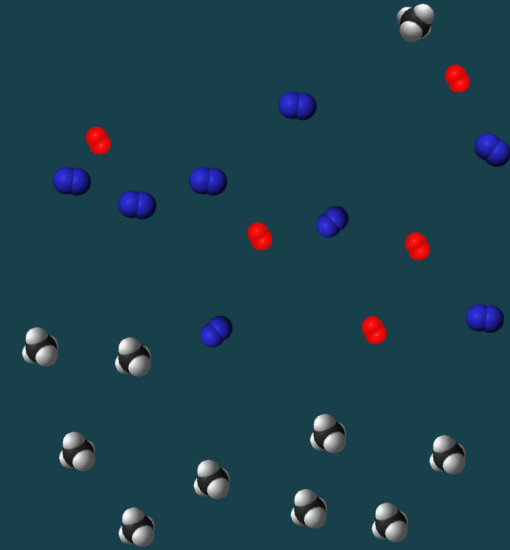
Innovative Cryogenic distillation to separate O₂ & N₂ from CH₄

At Ambient temperature (15°C)



Cool down:
Removal of kinetic energy
from the molecules

At Cryogenic temperature (-160°C)



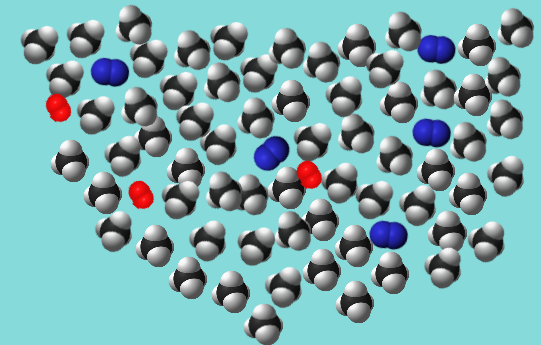
VAPOR PHASE

At ambient temperature:

- High energy, quick motion
- Molecules of CH₄, N₂ & O₂ display very similar kinetic diameter
 - ➔ Very **hard to separate** molecule based on their size as in PSA or membranes
 - ➔ **Low selectivity**

At -160°C:

- CH₄ molecules bind together (liquefaction); however, N₂ & O₂ stay vapor
 - ➔ **Easy separation, high selectivity**



LIQUID PHASE

Landfill Overview

- Steuben County owns and operates a MSW landfill in Bath, NY. The landfill accepts ~150,000 TPY.
- An LFGTE project was commissioned in 2011 and retired in 2019 due to economical reasons.
- Landfill gas flow below 650 scfm at time of RFP
- Nitrogen content measured at 19%
- H2S content up to 1,300 ppm
- Local gas distribution interconnect without prior RNG experience and limited gas demand during summer months

Selection Process

- In July 2020, the County launched a public RFP for the development of a beneficial use project.
- The RFP team included County staff, Barton & Loguidice (engineering), and Environmental Attributes Advisors (consultant).
- Main evaluation criteria:
 - Long-term partner
 - Technology
 - Financials
 - Minimal risk for the County
 - Gas interconnection solution
- Waga Energy was awarded in May 2021 to perform a due diligence study and begin contract negotiations.

Solution

- In December 2021, Steuben County and Waga Energy entered into a 20-year gas right agreement for the construction and operation of a WAGABOX® at the Bath Landfill.
- The Steuben WAGABOX® has the capacity to upgrade 1000 scfm of LFG into RNG, can accept up to 30% nitrogen and fits in less than a ½ acre.
- The project generates substantial new revenues for the County and allowed for further investment in the expansion of the landfill gas collection system.
- The RNG opportunity supported the County efforts to secure approval to expand the landfill air permit in a highly regulated state.

WAGABOX® 1000 at the Steuben Landfill, NY

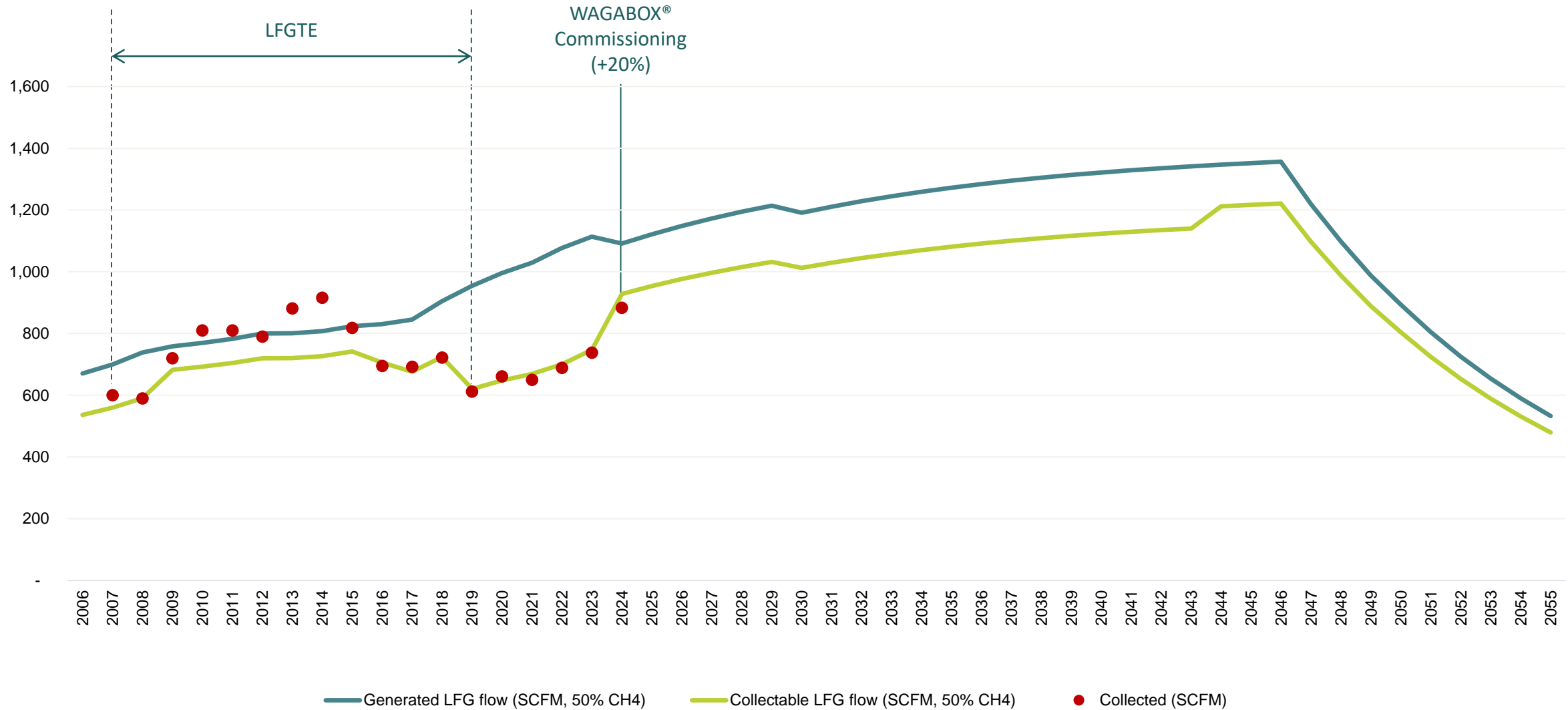
WAGABOX®

1. H2S removal
2. VOC removal
3. CO2 separation
4. CO2 polishing
5. N2 and O2 removal
6. Sales gas compression

- A. Thermal oxidizer
- B. Backup flare
- C. Electrical room



Bath Landfill Gas Evolution: Developing an energy project on a landfill, helped with the appropriate technology, is an incentive to drive methane capture



Waga Energy is expanding rapidly in North America

 In operation



GFL MALLARD

- Delavan, WI
- 2000 scfm, N2: 9%
- April 2022



ST ETIENNE

- St-Étienne-des-Grès, QC
- 2000 scfm, N2: 17-25%
- May 2023



GFL CHICOUTIMI

- Chicoutimi, QC
- 370 scfm
- December 2023



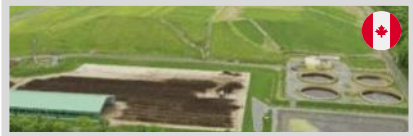
STEBEN

- Bath, NY
- 1000 scfm, N2: 19%
- March 2024



WCN WINNEBAGO

- Rockford, IL
- 6000 scfm, N2: 24%
- COD Q2-2024



BROME

- Cowansville, QC
- 600 scfm, N2: 17-25%
- COD Q2-2024



HARTLAND

- Vancouver Island, BC
- 2000 scfm, N2: 12%
- COD Q4-2024



CASELLA 1

- Location TBA
- 3000 scfm
- COD 2025



CASELLA 2

- Location TBA
- 3000 scfm
- COD 2025



CASELLA 3

- Location TBA
- 2000 scfm
- COD 2025



SCOTT AREA

- Davenport, IA
- 1000 scfm, N2: 15%
- COD 2025



LANCHESTER

- Chester County, PA
- 2000 scfm, N2: 14%
- COD 2025



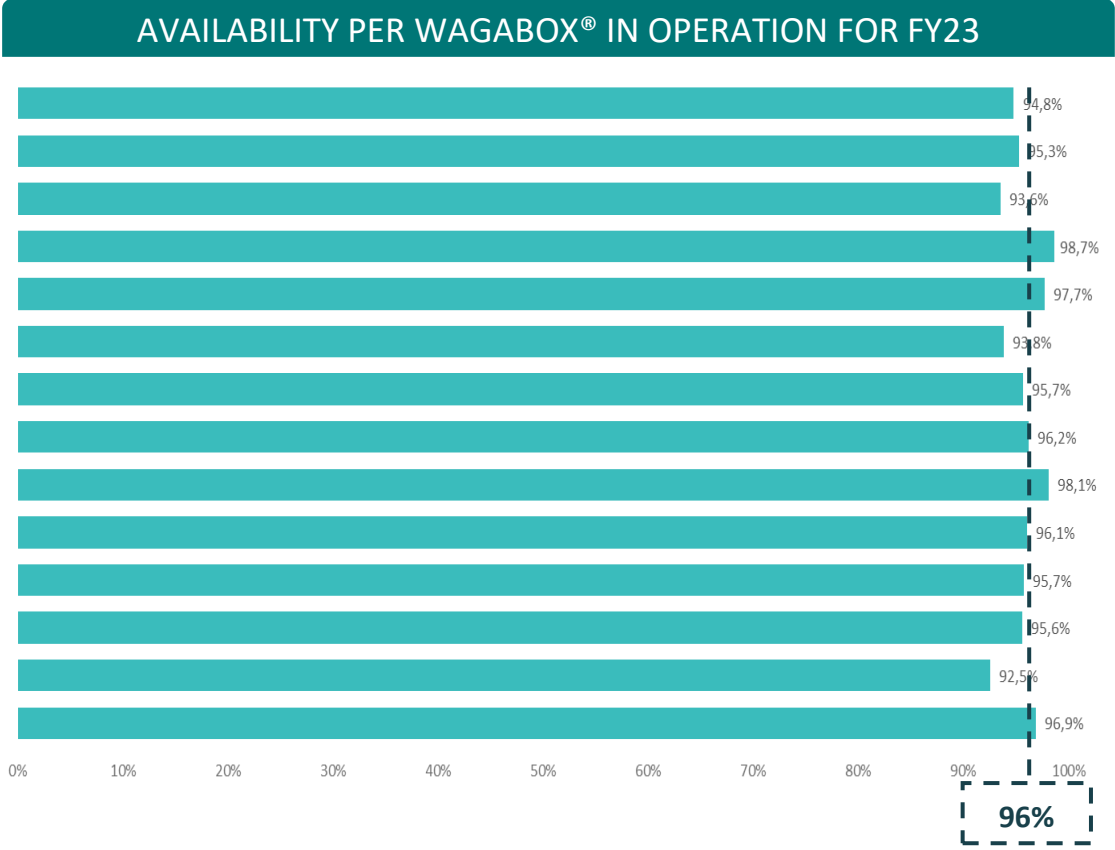
DECATUR HILLS

- Greensburg, IN
- 1000 scfm, N2: 14%
- COD 2026



Your
WAGABOX®
Here!

Guaranteed performance powered by a team of passionate experts and supported by smart automation



Overcoming Challenges in RNG Project Development

- Permitting & compliance: Landfill & RNG plant compliance synergies
- Stakeholder engagement
- Collaboration with local consulting engineers
- Landfill gas collection maximization strategies
- Processable gas standards for chosen technology
- Wellfield maintenance & operations
- Pipeline proximity and specifications
- Projecting electricity costs



Thank you!



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