Recovery of biogas from its waste landfills
Biomethane injected into the natural gas distribution network

With WAGABOX® technology, Veolia recovers the methane produced by the degradation of organic waste at landfill sites and injects it directly into the natural gas distribution network.

Starting date of the project	November 2018
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	Implemented on the Non-Hazardous Waste Landfills of Claye-Souilly (Seine et Marne), Saint Palais (Cher) and Le Ham (Manche).
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	Recovering the methane produced by the degradation of organic waste at landfills and injecting it directly into the natural gas distribution
Detailed project description	Reducing net CO2 emissions to zero by 2050, as set out in the European framework, requires the implementation of large-scale industrial solutions. The recovery of biogas from landfill waste is one of the key levers of Veolia's activities to contribute to this objective. This major project in partnership with Waga Energy, a Grenoble-based startup, is an emblematic illustration of this in terms of its size and impact. A true example of industrial and territorial ecology, it will make it possible to produce local, renewable and low-carbon energy. This innovation offers an energy efficiency three times higher than solutions consisting in burning biogas in an engine or a turbine to produce electricity. Biomethane can also be easily stored and transported using existing gas infrastructures. By substituting biomethane for natural gas, the WAGABOX® solution avoids the carbon emissions caused by the use of fossil fuels.

Main project's drivers for reducing the greenhouse gas emissions		
	Reduction levers	**Details on the aspects of the project**
	☐ Energy and resource efficiency (including behaviour)	
	☒ Energy Decarbonisation	Substitution of natural gas by biomethane
	☐ Energy efficiency improvements	
	☐ Improving efficiency in non-energy resources	
	☐ Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)	
	☐ Financing low-carbon producers or disinvestment from carbon assets	
	☐ Reduction of other greenhouse gases emission	

Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope		**Aspects of the project contributing to the reduction of emissions by emission category**	**Quantification of associated GHG emissions by emission category** **Please follow the quantification methodology used in the Afep guidelines**.
	Reduction of the company's carbon dependency		
	Scope 1 *Direct emissions generated by the company's activity.*	Methane recovery	21,1 kt CO2/year

Scope 2 *Indirect emissions associated with the company's electricity and heat consumption.*		
Scope 3 *Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.*		
Increase of carbon sinks		
Emissions Absorption *Carbon sinks creation, (BECCS, CCU/S, …)*		
GHG emissions avoided by the company at third parties		
Avoided Emissions *Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.*	Substitution of natural gas by biomethane	24 kt CO2/year

Clarification on the calculation or other remarks:

The WAGABOX® solution allows the recovery of 118 182 MWh PCI/year of biomethane. We can consider that this biomethane has an emission factor of 23,4 kgCO2eq/MWh PCI.

The emission factor of natural gas is about 227 kgCO2/MWh PCI. The injection of biomethane into the network, all other things being equal, avoids 203.6 kgCO2/MWh COD, i.e. for this installation more than 24,000 tCO2/year.

On the other hand, if the methane from the decomposition of the waste had not been recovered, its ordinary treatment by combustion would have resulted in the emission of 21,000 tCO2eq (GWP at 100 years = 30). The recovery of methane by the WAGABOX® solution therefore also avoids 21 000 tCO2/year at the non-hazardous waste storage facility.

In total, more than 45 000 tCO2eq/year are avoided by the WAGABOX® solution.

Modality of verification of the quantification.	**Calculation standard used (ADEME base, GHG protocol, etc.) :** Carbone base of' ADEME **Verification of the calculation (internal or external) :** Use of GRDF consumption data
Other environmental and social benefits of the project	The project is part of a contribution to various SDGs (Sustainable Development Goals) : ● In addition to GHGs, this project avoids the emission of other pollutants produced by the combustion of biogas (SDG 7 Clean and Affordable Energy, SDG 9 Industry, Innovation, Infrastructure, and SDG 13 Action on Climate Change). ● It is a territory-wide industrial ecology project with a partnership approach to accelerate ecological transformation (SDG 11 Sustainable Cities and Communities and SDG 17 Partnerships for Achieving the Goals). ● Finally, this project contributes to the creation of qualified industrial jobs in France (SDG 8 Decent work and economic growth).
Project maturity level Tick the corresponding current maturity level	☐ Prototype laboratory test (TRL 7) ☐ Real life testing (TRL 7-8) ☐ Pre-commercial prototype (TRL 9) ☐ Small-scale implementation ☒ Medium to large scale implementation **Remarks: click here to enter the level of maturity of the project**
Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential	This type of project is reproducible if the support mechanisms for biomethane injection projects from non-hazardous waste storage facilities are maintained.
Amount of investment made (in €)	The following investments have been made in the various landfills : ● Claye-Souilly: 11 million euros ● Saint-Palais: 3 million euros ● Le Ham: 3 million euros
Economic profitability of the project (ROI)	☐ ST (0-3 years) ☐ MT (4-10 years) ☒ LT (> 10 years)

	Remarks : Revenue through the sale of biomethane to energy providers under long-term contracts (15 years).
Engaged partnerships	A partnership between Veolia and Waga Energy, a young innovative company, has been initiated.
Open comments from the project owner	Biomethane injection projects from non-hazardous waste storage facilities would produce 2.4 TWh/year by 2025 and avoid the emission of 7 million tons of CO2 during the 15 years of the contract as a substitute for natural gas, which will not be able to be substituted in its entirety by other biomethane production channels (methanization, wastewater treatment plants) in the years to come
To learn more about the project	
Contact the company carrying the project	VEOLIA Technical and Performance Department RVD Contact on this subject : Antoine LAIR antoine.lair@veolia.com
Project URL links	https://www.veolia.com/fr/actualites/gaz-vert-production-biomethane-claye-souilly-france
Illustrations of the project	