Installing a **biomethanisation and cogeneration** unit

L'ORÉAL
LIBRAMONT PLANT

To reduce the carbon footprint of its Libramont factory's activities, L'Oréal has funded the installation of a biomethanisation unit next to the factory, enabling it to become energy self-sufficient from renewable biomass.

Start date of the project	The project has been operational since 2009.
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	Installation of a biomethanisation unit next to the L'Oréal factory in Libramont, Belgium. 
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	**To help the L'Oréal Libramont factory become energy self-sufficient (electrical and thermal energy) through the installation of a biomethanisation/cogeneration unit, next to the site.**
Detailed project description	Since its construction, the L'Oréal Libramont factory has begun multiple efforts to address environmental challenges. The Group's sustainability programme, *Sharing Beauty with All,* (which, in particular, set itself the goal of reducing the CO_2 emissions of the Group's factories and distribution centres by 60% between 2005 and 2020) was a catalyst to consider and action a fundamental transformation in terms of production and energy use. **The decision to use this technology was made to ensure production of renewable energy that would enable the site to achieve energy self-consumption (electrical and thermal) from renewable biomass:** • The origin of the inputs is as local as possible – 50,000 tonnes per year of organic products derived from the nearest agro-food industry. As for the digestate, this is reused as a fertiliser for agriculture through farms situated within a radius of a maximum of 50km. • The over-production of this 100% green electrical energy is injected into the national grid and can power around 5,500 households. • Thanks to this installation, up to 13,500 tonnes of CO_2 are saved annually in total (including the site and injection of excess electricity into the grid). Biomass, composed primarily of residues derived from the agro-food industry, is introduced into tanks called 'digesters' (4 x 3500m³). In these tanks, highly specific conditions enable bacteria to develop. These bacteria break down the material, and in this way, generate methane. This biogas powers cogeneration engines that, combined with a generator, produce electricity. The heat from the exhaust gases and the engine cooling systems is recaptured for the site's thermal needs (heating the buildings, production of steam, process water etc). This is the principal of 'cogeneration'. The unique aspect of the installation lies in the fact that the electricity and heat produced are used by L'Oréal. The production of green electricity being more than enough to meet the site's needs, the excess electricity (enough to power around 5,500 households) is injected into the national grid. The heat produced by the installation of cogeneration is used in different forms:

- The steam is necessary all year for the manufacture of products
- Hot water enables us to heat buildings during winter
- Hot water ensuring the cleaning of manufacturing equipment
- The evapo-concentrator
- The drying of mud from our water treatment station in a solar greenhouse with the aim of lowering its weight, and giving it a new lease of life in cement works, creating value while reducing our waste.

This installation replaces our boilers and generators fed by natural gas, which had met the factory's needs. This solution remains today as a back-up solution for cogeneration.

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	Production et consommation d'énergie renouvelable via une unité de biométhanisation / cogénération (Puissance installée : 3,1 MW électrique) pour réduire les usages d'énergies fossiles Production and consumption of renewable energy via a biomethanisation/cogeneration unit (power installed – 3.1MW electrical energy) to reduce the use of fossil energy.
☐ 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.*	The use of heat derived from the biomethanisation/ cogeneration unit.	27GWh/year 205kg CO_2/MWh = 5,530 tonnes of CO_2 **205 kg CO_2/MWh= Emission factor for natural gas (source: ADEME).*
Scope 2 *Indirect emissions associated with the company's electricity and heat consumption.*	Replacing electricity taken from the grid (in Belgium) with electricity produced by the biomethanisation unit.	10GWh/year x 172kgCO_2/MWh = 1,720 tonnes CO_2 **172 kgCO_2/MWh= Emission factor for electricity in Belgium (source: AIE)*
Scope 3 *Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.*		14GWh/year x 456kg CO_2 /MWh = 6,380 tonnes CO_2 *456*kg CO_2/MWh= Emission factor for the CO_2 avoided by the injection of renewable electricity into the grid (local source: supplier or grid manager).*
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.*	Agricultural emissions linked to the storage of feedstock outside (conventional practice) avoided on the farmer's site.	

Clarification on the calculation or other remarks: click here to specify

- Production potential :
  - Electricity: 24 GWh / year
  - Thermal: 27 GWh / year

This system delivers a total reduction across the site of up to around 7,200 tonnes of CO_2 per year.
Comment: The site's electrical consumption has hardly changed since the installation of the biomethanisation unit. This unit has a capacity of 10 GWh/year, the rest of the electricity produced is supplied to the national grid.

Modality of verification of the quantification

Calculation standard used (ADEME base, GHG protocol, etc.): GHG Protocol (the methodology followed by the L'Oréal Group to calculate its Scope 1, 2 and 3 carbon impacts); CWaPE Belgium has been used for this project in particular.

Verification of the calculation (internal or external): Approval by the accredited body BTV and SPW Energy – Belgian legal obligation (meter index, feedstock, and calculation of the volume of CO_2 avoided, etc) BTV: https://www.btvcontrol.be/fr.

Other environmental and social benefits of the project

This project has enabled us to create employment (five full-time employees).

It also contributes to the following SDGs:

- SDG 7 – Clean and affordable energy

The biomethanisation unit enables us to achieve the production and use of 100% green energy.
The electricity and heat for the site of L'Oréal's Libramont factory are produced thanks to organic waste derived from local agricultural and the agro-food industry. The installation produces more energy than is needed for the functioning of the factory. Consequently, the excess clean electricity (enough for the needs of around 5,500 households) is injected into the national grid.

- SDG 9 : Industry, innovation and infrastructure

Pioneer in this area and motivated by the Group, the Libramont factory has invested significantly in important environmental infrastructure, enabling the reduction of waste (in part due to the installation of a drying greenhouse for mud in 2014), of water consumption (a Waterloop factory since 2019, following the combination of two technologies (inverse osmosis and evapo-concentration) and of its GHG emissions (carbon neutral since 2014, the Group's first factory to achieve this, in part thanks to the installation of the biomethanisation unit).

- SDG 12 : Responsible production and consumption

Through the programmes *Sharing Beauty with All* (2013-200) and *L'Oréal for the Future* (2020-2030), the L'Oréal Group encourages, among others, its businesses to manufacture sustainably and significantly reduce their impact on the environment. For the year 2020, all the Group's production sites were set the goal of reducing their consumption of water, waste and GHG emissions by 60%, compared to 2005.

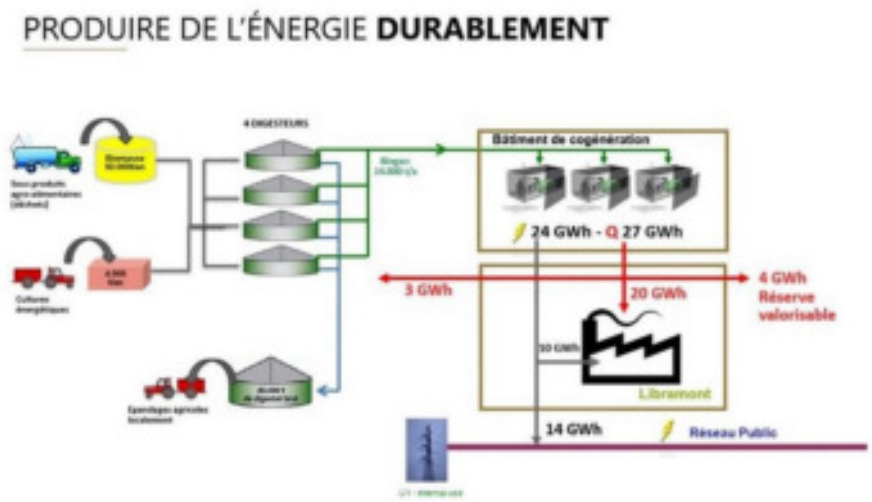
In terms of figures, in 2020, the Libramont factory reduced its waste in grams per finished product by 34%, recycled 100% of its industrial water in a loop, and was carbon neutral.
Through the *L'Oréal for the Future* programme, the Group is continuing its efforts and is setting itself new ambitious goals to achieve by 2030.

- SDG13: Climate action

The L'Oréal Group and all its entities take important measures to reduce their impact on the environment and our planet. While our first sustainability programme, *Sharing Beauty with All*, which featured a series of ambitious 2020 goals, has reached an end, L'Oréal is going even further in its environmental ambitions with *L'Oréal for the Future*. This is a strategic programme through which the Group aims to take on greater responsibility, mobilise its entire ecosystem (employees, suppliers, customers etc.) and show that businesses can be part of the solution, in the face of the challenges facing the world.
This programme is based around three pillars:

- Transforming our activity to respect planetary boundaries.
- Engaging our ecosystem in our transformation, helping our partners transition to a more sustainable model.
- Contributing to addressing challenges of the world by addressing the most pressing social and environmental needs.

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	Biomass technology is known but is strongly dependent on the geographical context and resource availability. The project led by L'Oréal's Libramont factory is operational and has been in place on our site for more than ten years. To guarantee the success of the project, a partnership of feedstock supply was developed with local industries (dairy, for example), based on the principles of the circular economy.
Amount of investment made (in €)	€13,000 k in 2009, funded by a third-party investor.
Economic profitability of the project (ROI)	☐ ST (0-3 years) ☐ MT (4-10 years) ☒ LT (> 10 years) **Remarks:** click here to enter the information
Engaged partnerships	The original objective was exclusively environmental, rather than economic. The aim was that this installation would enable us to produce clean energy at a cost that was equivalent to using energy derived from fossil energy (natural gas and conventionally produced electricity).
Open comments from the project owner	2009 to 2020: use and management by private, third party investors. 2020: re-purchase of the installation by L'Oréal in order to completely manage our own energy self-consumption.
More about the project	
Contact the company carrying the project	alexandra.vickery@loreal.com
Project URL links	Press articles • https://www.tvlux.be/video/libramont-l-oreal-inauguration-station-biomethanisation_4194.html • http://guider.be/article/loral_a_inaugur_sa_premire_centrale_biogaz.html • https://www.lavenir.net/cnt/363449 • https://www.usinenouvelle.com/article/l-oreal-se-chauffe-au-biogaz.N69562
Illustrations of the project	



PRODUCING ENERGY SUSTAINABLY

Agro-food by-products (waste) – Biomass 50,000/year

Energy crops – 4,000 tonnes per year

4 digesters

Agricultural spreading locally – 40,000 tonnes of raw digestate

Biogas – 14,000 tonnes per year

Cogeneration building

Recoverable reserve

National grid