Steam Production **from Biomass**

To produce steam consumed by the Saint Fons site, Solvay substitutes natural gas with a biomass heating plant that uses wood waste as fuel

Starting date of the project	**2021** : Pre-project study and environmental protection (ICPE) file granted **2022** : Administratives authorisations **2023 - 2024** : Building and industrial commissioning
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	The project aims at building a biomass boiler on the Solvay Saint Fons site, Rhône-Alpes region (France).
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	The main objective of the project is to decarbonise the heating power required for the steam the processes need to operate at the Solvay site in Saint Fons (Rhône-Alpes, France).
Detailed project description	The proposed solution is to build a new biomass boiler fuelled by waste wood (B wood) to produce the steam consumed by the site and which will substitute for the current boilers fuelled by natural gas. 
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	Partial substitution of natural gas consumed 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.*	Substitution of the consumed Natural Gas by biomass	41 ktCO2/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.*		

Clarification on the calculation or other remarks:

The project substitutes the annual consumption of 200 GWh PCI of natural gas.
The emission factor of natural gas considered is 205 kgCO2/MWh PCI.
The emission factor of the biomass considered is 0 kgCO2/MWh PCI.

The calculation of the annual reduction of direct CO2 emissions (scope 1) by using biomass instead of natural gas, expressed in tonnes of CO2, is :
Annual quantity of energy consumed in GWh x 1000 x (biomass emission factor in kgCO2/MWh - natural gas emission factor in kgC02/MWh) / 1000).

So, for the case exposed : $200\,000 \times (0 - 205)/1000 = -41\,000$ metric tonnes

So, the use of biomass allows a gain in direct emissions (Scope 1 Solvay) of 41 ktCO2 / year.

Modality of verification of the quantification.

Calculation standard used (ADEME base, GHG protocol, etc.): GHG protocol

Verification of the calculation (internal or external): External in the framework of ETS

Other environmental and social benefits of the project

In France, it is estimated that 20% of Wood B is not recovered under acceptable technical and economic conditions, and therefore is treated in landfill. So, a major issue is to improve the valuation of the wood B and this project will contribute to it.

Given the quantity of wood B required, this project will be structured through the establishment of a local supply chain and valorisation of wood B. The operation of the future boiler station will ensure sustainability for the sector and its associated employment area.

Project 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: The use of B-wood for energy purposes is still at a small-scale commercial stage in France. However, It is already commercialised on a larger scale in other countries such as Germany and the UK.

Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential

Potential for replicability of the project to other Solvay sites in France.
A preliminary study is underway for the Clamecy site (CO2 impact ~ -10kt/year).

Conditions for reproducibility:

	● Availability of a sustainable local wood waste stock ● Economic viability of the investment ● Anticipation of the site's long-term steam needs Several factors condition the success of such a project: ● The security of the planned supply plan ● Investment and operating aid ● The facilities classified as environmental protection (ICPE) procedure and the operating permit.
Amount of investment made (in €)	Investment estimated at €37M: ● Fuel preparation unit (grinding, screening,...) ● Conveying unit ● 30 MW steam boiler ● Extraction, analysis and treatment of fumes.
Economic profitability of the project (ROI)	☐ ST (0-3 years) ☐ MT (4-10 years) ☒ LT (> 10 years) **Remarks:** Economic interests for Solvay: ● Have a decarbonized biomass steam that is sustainably competitive compared to steam produced by natural gas. ● Preserve its market shares by meeting the requirements of its main committed customers in efforts to reduce their scope 3 emissions.
Engaged partnerships	Several actors contribute to the successful implementation of this project : ● Solvay: provides land and long-term commitment to purchase steam ● Dalkia: operation and maintenance of the installation ● Ademe: investment and operating aid ● Other third-party private investor partner to be confirmed.
Open comments from the project owner	In addition to a supply of biomethane sized to cover the combustion of production residues requiring the use of gas, this project aims to decarbonise all the heat consumed by the site.
More about the project	
Contact the company carrying the project	richard.bourdon@solvay.com
Project URL links	/
Illustrations of the project