Strive towards Net-Zero emissions with **recovery of all waste heat** on Montpellier R&D site

Sanofi has implemented waste heat recovery facilities at its R&D site in Montpellier, France in partnership with Dalkia, which has reduced the site's gas consumption and associated CO2 emissions.

Starting date of the project	**June 2019 :** Implementation of waste heat recovery & heat pumps **December 2019 :** Implementation of an external CHP and waste heat recovery for the site
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	South France - Montpellier **Copy/paste capability:** the targeted scope covers all French sites for which significant subsidies may be available to increase the project financial viability.
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	Reduce energy consumption of the Montpellier R&D site and associated CO2 emissions by recovering various heat sources available on site.
Detailed project description	The principle of low-temperature heat recovery is one of the priority areas of Sanofi's decarbonization approach. This project is divided into two sub-projects: The **first project** consists of setting up a low-temperature heat loop by recovering previously rejected heat. Heat recovery from two of the site's cooling units (fridge capacity of 1.3 MW each), associated with a high efficiency heat pump (1 MW heat pump) makes it possible to increase the heat recovered (45 ° C) to then reinject it into the site's hot water heating network (at a temperature of 70-80 ° C depending on the season). This first project was fully funded (€ 1 million) by White certificates (CEE in France) generated by heat recovery from the chillers and was carried by Dalkia in partnership with EDF for the Whites certificates. In addition, a 15-year Energy Performance Contract (CPE in France) has been signed with Dalkia to guarantee the energy performance of the installation over time. This waste heat recovery installation has been in service since June 2019. Led by site Engineering & Maintenance teams, a **second project** was pursued, installation of a cogeneration unit (1MW) to produce both electricity and heat by the use of natural gas. The heat produced by cogeneration is sent directly to the site's hot water heating network and the electricity produced is entirely self-consumed by the site and is exempt from transport tax. Similar to a boiler equipped with a condenser, the heat from the cogeneration (CHP) fumes is also recovered and sent to the low temperature heat loop previously installed. This project was fully financed as a third-party investment by Dalkia for an amount of € 1.4 million with a 15-year installation operating contract. This CHP has been in service since December 2019.
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	
☒ 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	

<table>
<tr><td>Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope</td><td>
<table>
<tr><th></th><th>Aspects of the project contributing to the reduction of emissions by emission category</th><th>Quantification of associated GHG emissions by emission category

Please follow the quantification methodology used in the Afep guidelines.</th></tr>
<tr><td colspan="3">Reduction of the company's carbon dependency</td></tr>
<tr><td>Scope 1
Direct emissions generated by the company's activity.</td><td>Reduction of the use of the internal natural gas boiler and recovery of fatal heat on the cooling units</td><td>- 1611 tCO2</td></tr>
<tr><td>Scope 2
Indirect emissions associated with the company's electricity and heat consumption.</td><td>Supply on external heat from CHP (including hot water)</td><td>+ 632 tCO2</td></tr>
<tr><td>Scope 3
Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.</td><td></td><td></td></tr>
<tr><td colspan="3">Increase of carbon sinks</td></tr>
<tr><td>Emissions Absorption
Carbon sinks creation, (BECCS, CCU/S, …)</td><td></td><td></td></tr>
<tr><td colspan="3">GHG emissions avoided by the company at third parties</td></tr>
<tr><td>Avoided Emissions
Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.</td><td></td><td></td></tr>
</table>
Details on the calculation or other remarks:
In 2018, 14,728 MWh_hhv of natural gas were consumed, i.e. 2,725 tCO2 (considering an emission factor of 185 kgCO2 / MWh_hhv)

In 2020, 6,025 MWh_hhv were consumed, i.e. 1,114 tCO2 (with the same emission factor)

the heat purchase in 2020 represents 5017 MWh_lhv resulting in the emission of 632 tCO2 (with an emission factor of 0.126 tCO2 / MWh_hhv).

The total emission savings therefore amount to 979 tCO2
</td></tr>
<tr><td>Modality of verification of the quantification.</td><td>Calculation reference system used (ADEME base, GHG Protocol, etc.): GHG Protocol and Base Carbone Ademe
Calculation verification (internal or external): Internal verification</td></tr>
<tr><td>Other environmental and social benefits of the project</td><td>The implementation of this project has resulted in a significant reduction in the use of on-site gas boilers. Therefore, the site will consider eliminating the site's boiler room in favor of high-temperature, high-efficiency heat pumps.
Studies are underway on the subject.
This elimination of the boiler room would lead to a significant reduction in CO2 emissions and would make it possible to contribute to SDG 7 Clean and affordable energy and SDG 13 Measures relating to the fight against climate change.</td></tr>
<tr><td>Project maturity level</td><td>☐ 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 : Cliquez ici ou appuyez ici pour préciser le niveau de maturité du projet</td></tr>
<tr><td>Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential</td><td>The condition for reproducibility is to have exchangers on the treatment plants sized for low temperature and the financing of the hot water network.</td></tr>
<tr><td>Amount of investment made (in €)</td><td>0 € for Sanofi
Tiers Investment 2,4 M€</td></tr>
<tr><td>Economic profitability of the project (ROI)</td><td>☐ ST (0-3 years)
☒ MT (4-10 years)</td></tr>
</table>

	☐ LT (> 10 years) **Remarks :** Cliquez ou appuyez ici pour entrer du texte.
Engaged partnerships	Through this project, several partnerships have been initiated: ● A 15-year contract of energy performance with Dalkia for heat recovery; A 15-year operation and purchase contract for heat and electricity with Dalkia for cogeneration.
Open comments from the project owner	/
More about the project	
Contact the company carrying the project	Christophe ALLIONE Christophe.allione@sanofi.com
Project URL links	NA
Illustrations of the project