

Cysoing nursing home in the south of Lille, France's first passive low carbon nursing home



This project aims to build France's 1st passive low-carbon EPHAD nursing home (Etablissement d'Hébergement pour Personnes Agées Dépendantes), and is in line with the Eiffage Group's ecological transition strategy. The multi-labelled "Les Résidences de la Pévèle" nursing home in Cysoing will meet Passivhaus, NF HABITAT HQE Excellent level, and E+C- level E3C1 certifications.

Starting date of the project	October 2019, foundation stone laid on 13 December 2019.
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	Cysoing, Nord.
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	Build France's first passive low-carbon nursing home in Cysoing (Nord), south of Lille.
Detailed project description	Committed to the ecological transition for more than ten years, in 2020 the Eiffage group confirmed the integration of crucial issues linked to climate change and the erosion of biodiversity into its strategy. The change management process led by the Group is based on a triple approach – low-carbon strategy, transition to the circular economy and preservation of biodiversity and ecosystems - which corresponds to the three pillars of the ecological transition. In each of these areas, new commitments were made and commitments that were already well established were renewed and amplified. In this respect, and in accordance with the national climate change mitigation policy aimed at carbon neutrality, Eiffage is expanding its range of low-carbon solutions while seeking to industrialise those already offered by the various divisions. In the case of the Cysoing nursing home, the building's carbon footprint is reduced thanks to a combination of several solutions: - the use of wood, with the installation of timber-framed walls – i.e. pre-insulated prefabricated cladding on the facades to create the structure for the first and second floors of the building, ensuring both quality and rapid installation, as well as CLT floors; - the use of renewable energies, the care home will be equipped with solar panels used to preheat the facility's domestic hot water supply; - the reduction of construction impact, with the installation of prefabricated modules manufactured by Eiffage Construction Industries - bathrooms assembled in the workshop as a single block, before being transported on site. <u>Wood: 80% of the building's structure</u> <u>Primary energy consumption</u> 93.5 kWhpe / m².year (Method of calculation: RT 2012) The project's strong points include its massive use of wood and the optimisation of materials, thanks to the industrialised manufacture of various elements (pre-insulated wooden facade cladding, prefabricated turnkey bathroom units assembled at Eiffage Construction workshops - HVA Concept™ units). The bathroom modules have a 40% reduced weight compared to conventional bathroom units. The LCA (Life Cycle Assessment) calculation carried out during the design phase as part of the E+C- labelling, with the objective of reducing the carbon emissions of construction products and equipment and energy consumption, was confirmed during the execution phase. The LCA confirms the E3C1 level in this respect (see below).

	It should also be noted that the nursing home has a nature-based design approach: grey-tinted larch will be used for all the facades and the block roofs will be planted with succulents to help with heat regulation. This flagship project in terms of low-carbon construction involves teams from Eiffage Construction Nord, Eiffage Services as well as the Group's Sustainable development and transverse innovation department. Eiffage Services, a subsidiary of Eiffage Concessions, will be responsible for the operation and maintenance of the building for the first five years. The entire project was carried out using BIM Management Operation Maintenance (GEN) tools. The data collected will be used to facilitate the maintenance and operation of the facility over time.		
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		Installation of solar panels
	☒ Energy efficiency improvements		BIM design + Significant energy performance: level E3
	☒ Improving efficiency in non-energy resources		BIM design + Compactness & efficient building shell
	☒ Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)		Green spaces and green roofs + Bio-sourced materials
	☐ Financing low-carbon producers or disinvestment from carbon assets		
	☐ Reduction of other greenhouse gases emission		
	Energy 3 - Carbon 1 performance levels		
	E3C1		
The Cysoing nursing home project meets <u>Energy 3 - Carbon 1</u> performance levels - Energy performance levels: BEPOS rating = 135.1 kWh / m² (Level E3: BEPOS rating <144.6 kWh / m² floor space) - Performance levels for greenhouse gas emissions: Total Eges = 1,323.1 kg eq.CO2 / m² floor space (Level C1: Total Eges <1,990.7 kgCO2eq. / m² floor space) PCE Eges = 789.7 kg eq.CO2 / m² floor space (Level C1: PCE Eges <1,050 kgCO2eq. / m² floor space) The project complies with provisions under the Law on Ecological Transition for Green Growth, which aims for exemplary construction in terms of energy and environmental performance. The performance levels achieved (Energy 3 and Carbon 1) comply with the performance levels referred to in the <i>Decree of 10 April 2017</i> which, in application of the <i>Decree of 21 December 2016</i>, foreshadows the future <i>RBR 2020</i> thermal and environmental regulation.			
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 <i>Direct emissions generated by the company's activity.</i>	The emissions in this scope include GHG emissions relating to worksite activities.	Construction phase: +279 tCO2eq.
	Scope 2 <i>Indirect emissions associated with the company's electricity and heat consumption.</i>		
	Scope 3 <i>Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.</i>	The emissions in this scope include GHG emissions relating to construction materials and equipment, as well as energy consumption during the lifespan of the building	Operations phase: 4,024 tCO2eq.
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		for the first and second floors of the building, as well as CLT floors.																																										
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	Increase of carbon sinks																																											
	Emissions Absorption <i>Carbon sinks creation, (BECCS, CCU/S, ...)</i>	Use of wood for the structure																																										
	GHG emissions avoided by the company at third parties																																											
	Avoided Emissions <i>Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.</i>		2,614 tCO ₂ eq.																																									
Clarification on the calculation or other remarks: E+C- and PHPP calculation methods Consolidated carbon footprint data To reduce the carbon footprint of the materials used, the building uses a wood / concrete mix: wood has been widely favoured on both floors, where it represents 80% of structural materials compared with 20% concrete. On the ground floor, the proportion is reversed with 80% concrete for 20% wood. This passive solution includes a thick layer of insulation, all thermal bridges being remedied. A heat pump is being installed for heating and domestic hot water requirements. More than 2,600 tonnes of carbon were avoided on this operation, as shown by the consolidated carbon footprint data:																																												
<table border="1"> <thead> <tr> <th></th><th>Base emissions (tCO₂eq.): 100% concrete solution RT 2012 All gas-fired</th><th></th><th>Variant emissions (tCO₂eq.): Mixed wood / concrete solution - PASSIVE - Solar DHW</th><th>Tonnes of tCO₂eq. avoided</th></tr> </thead> <tbody> <tr> <td>Construction phase</td><td>Base emissions (tCO₂eq.):</td><td>Construction phase</td><td>Variant emissions (tCO₂eq.):</td><td></td></tr> <tr> <td>Concrete</td><td>520</td><td>Mixed wood / concrete solution</td><td>275</td><td>241</td></tr> <tr> <td>Operations phase</td><td>Base emissions (tCO₂eq.):</td><td>Operations phase</td><td>Variant emissions (tCO₂eq.):</td><td></td></tr> <tr> <td>Energy (over 50 years)</td><td>6,450</td><td>Energy (over 50 years)</td><td>4,024</td><td>2,467</td></tr> <tr> <td>RT 2012</td><td>Base emissions (tCO₂eq.):</td><td>PASSIVE</td><td>Variant emissions (tCO₂eq.):</td><td></td></tr> <tr> <td></td><td>171</td><td></td><td>265</td><td>-54</td></tr> <tr> <td></td><td></td><td></td><td>Total CO₂ avoided</td><td>2,614</td></tr> </tbody> </table>						Base emissions (tCO ₂ eq.): 100% concrete solution RT 2012 All gas-fired		Variant emissions (tCO ₂ eq.): Mixed wood / concrete solution - PASSIVE - Solar DHW	Tonnes of tCO ₂ eq. avoided	Construction phase	Base emissions (tCO ₂ eq.):	Construction phase	Variant emissions (tCO ₂ eq.):		Concrete	520	Mixed wood / concrete solution	275	241	Operations phase	Base emissions (tCO ₂ eq.):	Operations phase	Variant emissions (tCO ₂ eq.):		Energy (over 50 years)	6,450	Energy (over 50 years)	4,024	2,467	RT 2012	Base emissions (tCO ₂ eq.):	PASSIVE	Variant emissions (tCO ₂ eq.):			171		265	-54				Total CO ₂ avoided	2,614
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Modality of verification of the quantification.	Calculation standard used (ADEME base, GHG protocol, etc.): LCA software approved for the calculation of the "Carbon" part of the E+C- label Verification of the calculation (internal or external): Verification via certifications and labelling (HQE / Passivhaus and E+C-)																																											
Other environmental and social benefits of the project	  																																											

The project allows two nursing homes, Cysoing and Templeuve-en-Pévèle, to be regrouped at a single site, with two buildings housing 88 beds, making it possible to streamline the buildings' footprint.

Reduced impact on land and preservation of water resources

Soil sealing operations are reduced, and the presence of open ground and the planting of local and resistant species have been favoured on site. In addition, site crews did not use piles and applied soil reinforcement techniques. The absence of underground parking and the installation of grassed paved parking areas also help to reduce land artificialisation.

Rainwater runoff collection pits have been set up along with pumps, to recover rainwater used for watering the landscaped areas.

This global performance contract, including the design, construction and operations and maintenance services for a period of 5 years, made it possible to better integrate the concept of sober energy use in the operation, maintenance and servicing phases.

By associating upstream the design teams with the teams responsible for the execution of the works and the facility's operation, unlike conventional project management contracts, the consortium was able to be more proactive in developing the most innovative solutions best suited to the project's characteristics, across the entire lifespan of the building. For example, Eiffage Construction Nord offered a more energy-efficient solution for the building's heat production systems, in order to optimise investment costs while at the same time reducing operating costs.

Generational diversity and social inclusion

Additionally, in order to promote the optimal integration of the project into the urban fabric of the local area, i.e. close to the town centre and public facilities already connected with the Cysoing nursing home site (e.g. nurseries, schools and secondary schools), a site was selected at the junction between a business park and various community facilities (football pitch, schools, etc.)

The outdoor spaces have been designed as an extension of the building itself and are arranged in a series of themed flower and vegetable gardens, shared between the residents and people in the local area. These outdoor spaces provide a place to meet and enjoy the environment, and contribute to the therapeutic dimension of the nursing home, enabling residents to spend time "outside the walls" in contact with nature.

The project therefore aims to be both open to the city and intergenerational, promoting multi-functional use and social inclusiveness, with:

- a rear pathway leading into the city,
- the integration of a play area for children in the rear garden of the nursing home, to encourage contact between elderly residents and the local population,
- communal allotments located in the nursing home's garden.

Care of the most vulnerable

The facility focuses on supporting its residents' dependency needs but also maintaining their social life, offering a new pathway in terms of housing for the elderly population of the Cysoing area.

Maintaining full autonomy at any age does not necessarily equate with staying in the same accommodation. Walk-in showers, light paths, ergonomic equipment, domestic automation, etc. - there are many new types of tools and equipment that can prove necessary after a certain age, in order to be able to continue living well in the community, "at home".

Far from the image conjured up by the traditional "hospice", EPHAD nursing homes have evolved over many years to become more human-centred. Staff are trained to care for residents who are sometimes highly dependent and who may have Alzheimer-type pathologies or senile dementia. As part of the Alzheimer's living unit (UVA) at the Cysoing nursing home, an external pathway has been installed to allow residents to walk around in complete safety (see illustration below).



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 - Construction of a building in Cysoing, a small town with close to 5,000 residents Remarks: Delivery in summer 2021, commissioning in October 2021
Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential	The project and the solutions proposed by Eiffage Construction enable significant carbon savings, in line with the Group's low-carbon policy. The mixed wood / concrete solution and the prefabricated bathrooms, offer a very high potential for duplication, reinforced by the compact design of the building. The project is an effective demonstrator, since the building system used is transferable to other types of construction, particularly hospitals or EPHAD nursing homes, palliative care centres, intergenerational housing, etc., given that it is divided into four components: 1. Creation of a structure consisting of a concrete ground floor and mostly timber-framed upper floors, 2. Installation of 88 prefabricated bathroom units, 3. "Passive" solution: insulation via the facades, roofs and under floors, as well as triple glazing, 4. Combined solar panels + gas.
Amount of investment made (in €)	€11 million excl. VAT (works and operation-maintenance services for a period of 5 years)
Economic profitability of the project (ROI)	☐ ST (0-3 years) ☐ MT (4-10 years) ☒ LT (> 10 years) Remarks: Energy savings of around 75% compared to French label standards
Engaged partnerships	Associated partners: GO and Paindavoine-Parmentier architect firms, Ingerop, Verdi, Behal Legrand, Akoustik, Eiffage Services
Open comments from the project owner	Benjamin Dumortier, the Mayor of Cysoing, aims to build a nursing home for the 21st century. A climate-air-energy and regional development plan has been put in place for the Pévèle-Carembault federation of municipalities (communauté des communes) that includes Cysoing, including in particular a GHG reduction target. The Cysoing low-carbon nursing home project fits fully with this plan.
More about the project	
Contact the company carrying the project	Marc-Antoine Jacqz - marc-antoine.jacqz@eiffage.com
Project URL links	https://www.eiffageconstruction.com/medias/actualites/eiffage-construction-lance-la-construction-de-lehpad-passif-bas-carbone-de-cysoing https://www.eiffageconstruction.com/medias/actualites/labels-au-bois-dor--eiffage-construction-pose-les-derniers-elements-bois-du-multi-labellise-ehpad-de-cysoing https://www.lemoniteur.fr/photo/dans-le-nord-un-ehpad-triplement-vertueux-progresse-a-grande-vitesse.2115804/ehpad-de-cysoing-nord-paindavoine-parmentier.1
Illustrations of the project	• Video - a low-carbon development project for the Cysoing nursing home 

