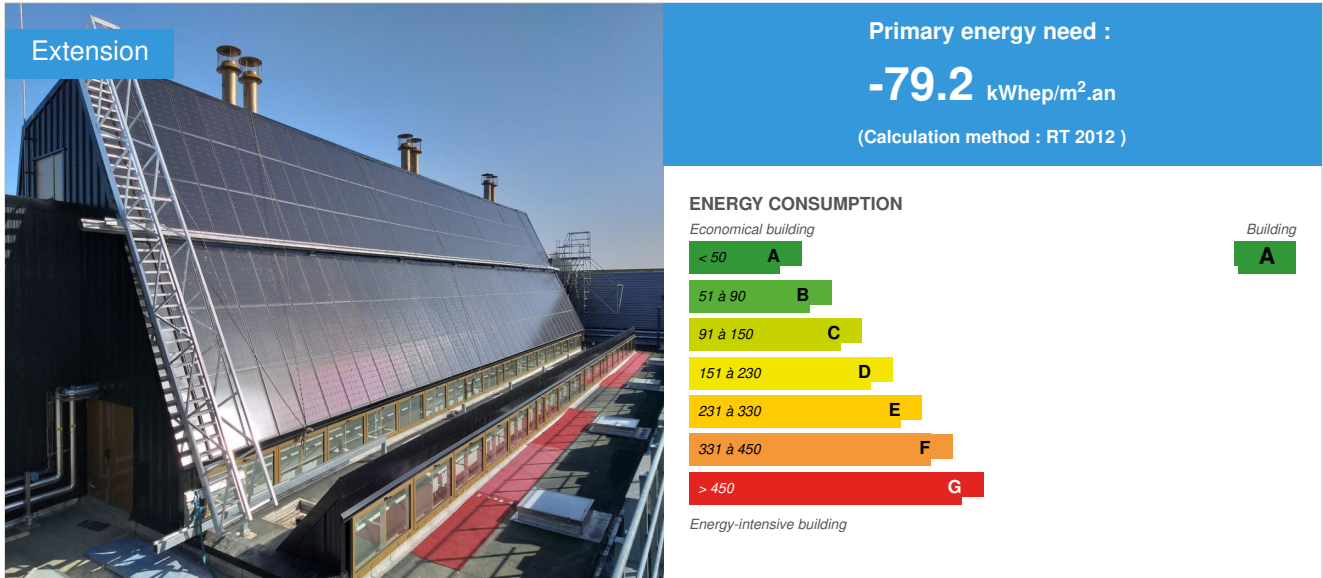


## Extension of L'Oréal factory

by Jean Luc Collet / 2021-03-24 15:43:16 / France / 9250 / FR



**Building Type** : Factories  
**Construction Year** : 2019  
**Delivery year** : 2021  
**Address 1 - street** : Avenue Henri Lefebvre 59540 CAUDRY, France  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 3 393 m<sup>2</sup> SHON RT  
**Construction/refurbishment cost** : 7 700 000 €  
**Cost/m2** : 2269.38 €/m<sup>2</sup>

Certifications :



### General information

The program for the extension of the L'Oréal SICOS plant in Caudry aimed to integrate the possibilities of valuing renewable energies for the benefit, first of the extension, then of the plant.

First of all, a reduction in needs through an architectural envelope made from high-performance local biosourced materials, displaying the new generation of industrial buildings with ambition level RE 2050. Elevations in wood-straw boxes covered with saturated wood cladding.

Then, the project presents several technologies of natural low temperature energy transfers:

- aerovoltaics for the production of electricity and daytime hot air or fresh night air (324 m<sup>2</sup>).
- 36 geothermal probes at a depth of 190 m, ie 6,840 ml of transfer of calories and frigories in inter-seasonal storage under the building to optimize the footprint on the ground.

- Reconstitution of the water table by infiltration retention of rainwater and geothermal recharge of probes.

## Sustainable development approach of the project owner

**"We want to be an exemplary company in terms of sustainable development and in particular in terms of the environment"** Jean Paul Agon, June 2012, CEO L'Oréal group.

### Goal.

Consider the 3,500 m<sup>2</sup> extension of the existing 50,000 m<sup>2</sup> plant, an exemplary break with traditional design approaches, in order to bring out environmental possibilities, particularly renewable energy.

### Original ambition.

Consider remedies:

- o Biosourced materials from the architectural envelope to reduce thermal needs.
- o The natural energies of the site and their use in the service of the extension project, but also for the benefit of the existing plant, if possible.

### First green building.

It is the programmatic importance of the plant extension operation that made it possible to initiate an exemplary project approach with a spirit of openness to virtuous environmental innovation.

From the program provided, it was the subject of holistic re-questioning which continued as a dynamic driver during the phases of design, consultation of companies, development of PEOs, execution performance, refinement and perseverance of finalization. new emerging technologies.

## Architectural description

The Sicos (Caudry) site of the L'Oréal group specializes in cosmetic emulsion products. The objective of the project was to bring together the stocks of alcohol in a dedicated place, contiguous and isolated from the factory.

The extension of approximately 3,400 m<sup>2</sup> on the ground, 10 meters under the ceiling, adjoining the plant, was built in a reinforced concrete structure with a large range anti seismic level 3, associated with an insulating jacket in wooden boxes filled with bundles of straw, fireproof 2h.

The infrastructure piles (20 m), coexist with the 36 vertical geothermal probes 190 m deep.

The superstructure in reinforced concrete beams, long span, supporting pre-stressed alveolar slabs receives on the exterior vertical walls, the wooden boxes with filling in bundles of compressed straw, modulated on the constructive grid.

A wooden frame, placed on the roof terrace, houses all the technical equipment such as exchangers, heat pumps, buffer tanks, etc. and receives the 216 aerovolatical sensors on its southern slope.

## See more details about this project

### Photo credit

Jean-Luc Collet

## Stakeholders

### Contractor

Name : L'Oréal Opérations

### Construction Manager

Name : Jean Luc Collet Architecte Urbaniste

Contact : Jean Luc Collet, jcollet[a]nordnet.fr, 03-27-38-10-20

### Contracting method

Other methods

## Energy

### Energy consumption

Primary energy need : -79,20 kWhep/m<sup>2</sup>.an

Primary energy need for standard building : 114,10 kWhep/m<sup>2</sup>.an

Calculation method : RT 2012

Breakdown for energy consumption : 1) Geothermal energy: Useful heating output from the HP output = 171,400 MWh / year or 52.6 KWh EP / m<sup>2</sup> / year Useful cooling output heat pump = 301,900 MWh / year or 92.6 KWh EP / m<sup>2</sup> / year Heating reference building = 238,100 MWh / year or 73 KWh EP / m<sup>2</sup> / year Cold reference building = 134,200 MWh / year or 41.1 KWh EP / m<sup>2</sup> / year 2) Aerovoltaic solar collectors: Useful heating production output collectors = 98.3 MWh / year or 38.3 KWh EP / m<sup>2</sup> / year Useful cooling output from the collectors = 12 MWh / year or 3.6 KWh EP / m<sup>2</sup> / year Self-consumed electricity production = 50.654 KWh / year or 6.2 KWh EP / m<sup>2</sup> / year 3) Summary: Hot: 73 - (52.6 + 38.3) = - 17.9 KWh EP / m<sup>2</sup> / year Cold: 92.6 - (41.1) + 3.6 = - 55.1 KWh EP / m<sup>2</sup> / year Electricity: -6.2 KWh EP / m<sup>2</sup> / year TOTAL = - 79.2 KWh EP / m<sup>2</sup> / year

## Real final energy consumption

Final Energy : 14,50 kWhef/m<sup>2</sup>.an

## Renewables & systems

### Systems

Heating system :

- Heat pump
- Geothermal heat pump
- Tape
- Aerotherm Heater
- Solar thermal

Hot water system :

- Heat pump
- Solar Thermal

Cooling system :

- Reversible heat pump
- Geothermal heat pump
- Tape

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic
- Solar Thermal
- Heat Pump on geothermal probes
- Heat pump

## Environment

### Urban environment

The SICOS factory is located at the southern limit of the territory of the municipality of Caudry, on the edge of the railway line.

The site of the operation, positioned to the north-west of the industrial site, is framed on its east, south and west orientations by production buildings, the two of which facing each other are linked by a communication gallery.

With little difference in level, it is separated by an emergency access road in its northern orientation from a stripping awning which faces it, with beyond a grassy embankment and a cedar hedge lined with a fence, the rue de l'Europe.

To the south of the gallery linking the adjacent buildings to the east and west (called A and D), an outdoor space framed by constructions generates a large-scale patio, partially occupied by a dust collection tower and prefabricated units welcoming the quality department, which will be demolished for this operation. The rest of the available space is sodded or covered with red shale, without any planting.

To the north of the gallery, which will also be demolished, there is an asphalt truck turning area and unloading docks for the use of the building on the eastern edge. These elements will also be demolished and filled in in order to find a level base and free of any obstacle.

## Products

## Product

Prefabricated wooden frame boxes with straw infill

ACTIV'HOME

Product category : Gros œuvre / Structure, maçonnerie, façade



190 m deep vertical geothermal probes

GEOFORAGE

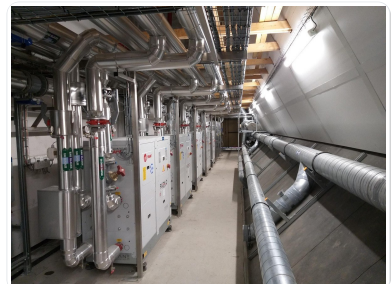
Product category :



Water-to-water heat pumps

TRANE

Product category :



Aerovoltaic solar collectors

SYSTOVI

Product category : Second œuvre / Equipements électriques (courants forts/faibles)



## Costs

### Construction and exploitation costs

Cost of studies : 740 000 €

Total cost of the building : 8 440 000 €

Subsidies : 880 000 €

## Contest

### Reasons for participating in the competition(s)

The objective of the project was to bring together the stock of alcohol in a dedicated place, isolated from the factory. The extension of approximately 3,400 m<sup>2</sup> on the ground, 10 meters under the ceiling, adjoining the plant, was built in a level 3 earthquake-resistant structure, associated with an insulating jacket made of

wooden boxes filled with bales of local straw.

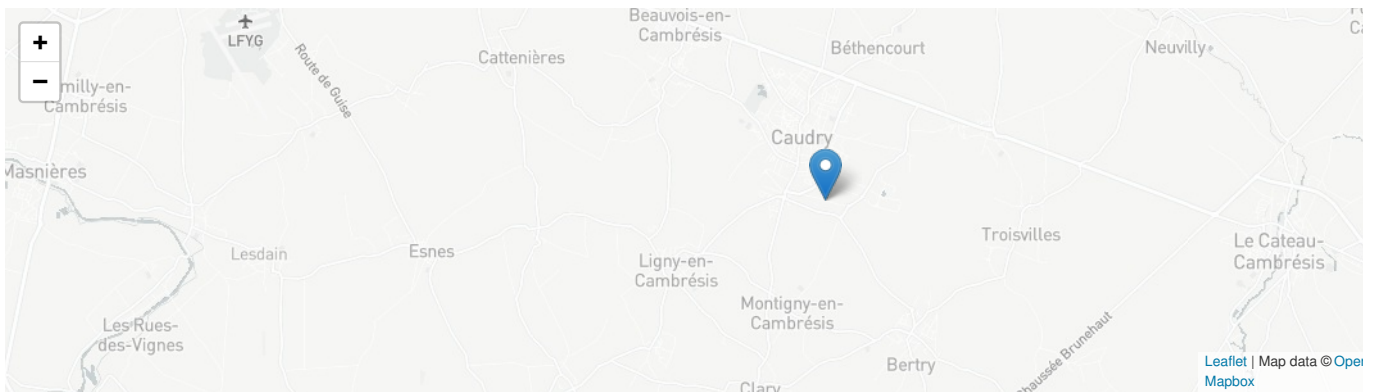
The self-supporting and prefabricated modular wood / straw boxes made it possible to quickly remove air and water from the vertical walls. They are dressed with an exterior cladding, in Douglas-fir from Haute Savoie, saturated. The wooden structure sheds bring natural light into the labs. 36 vertical geothermal probes make it possible to exploit the natural resources of the subsoil, 324 m<sup>2</sup> of aerovoltaic solar collectors, placed on a wooden frame, produce electricity, hot air during the day and cool at night, recovered by exchangers and reinjected into the hydraulic factory networks.

The infrastructure piles coexist with 36 vertical geothermal probes 190 m deep. The superstructure made of reinforced concrete beams, long span, supporting pre-stressed honeycomb slabs receives on the exterior vertical walls, the wooden boxes with filling in bundles of compressed local straw, modulated on the construction grid. A wooden frame, placed on the roof terrace, houses all the technical equipment such as heat exchangers, heat pumps, storage tanks, etc. and receives the 216 aerovoltaic sensors on its southern slope.

## Building candidate in the category



Energie & Climats Tempérés



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