

Les Jardins du Parc Résidence, Toulouse, France

A newly built luxury 4-storey apartment building with a centrally installed PVT supported domestic hot water heat pump

Key facts

Building

Location	Toulouse, France
Construction	November 2016
Heat distribution	electric radiators
Heated area	2184 m ² living
Level of insulation	

Heat pump and source

Number of heat pumps	
Installed capacity	12 kW
Operation mode	monoenergetic
Heat source	Solar PVT
Brand and type	Heliopac
Refrigerant	R134a
Sound level	dB

Heating system

Heat demand	50 kWh m ² /year
Heating temperature	°C

Domestic hot water

Type of system	see overview
Max. Temperature	65°C
Circulation system	see description
Legionella measures	thermal
Storage size	2000 litres
Number of storage tanks	2
Storage losses	
Temperature control	

Other information

Electric energy	9 173 kWh
Consumption year	50 kWh m ² /year
Investments costs	unknown
PV installation	57,6 m ² (36 capteurs monocristallins). 9 kWp
Solar thermal	



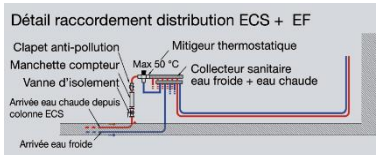
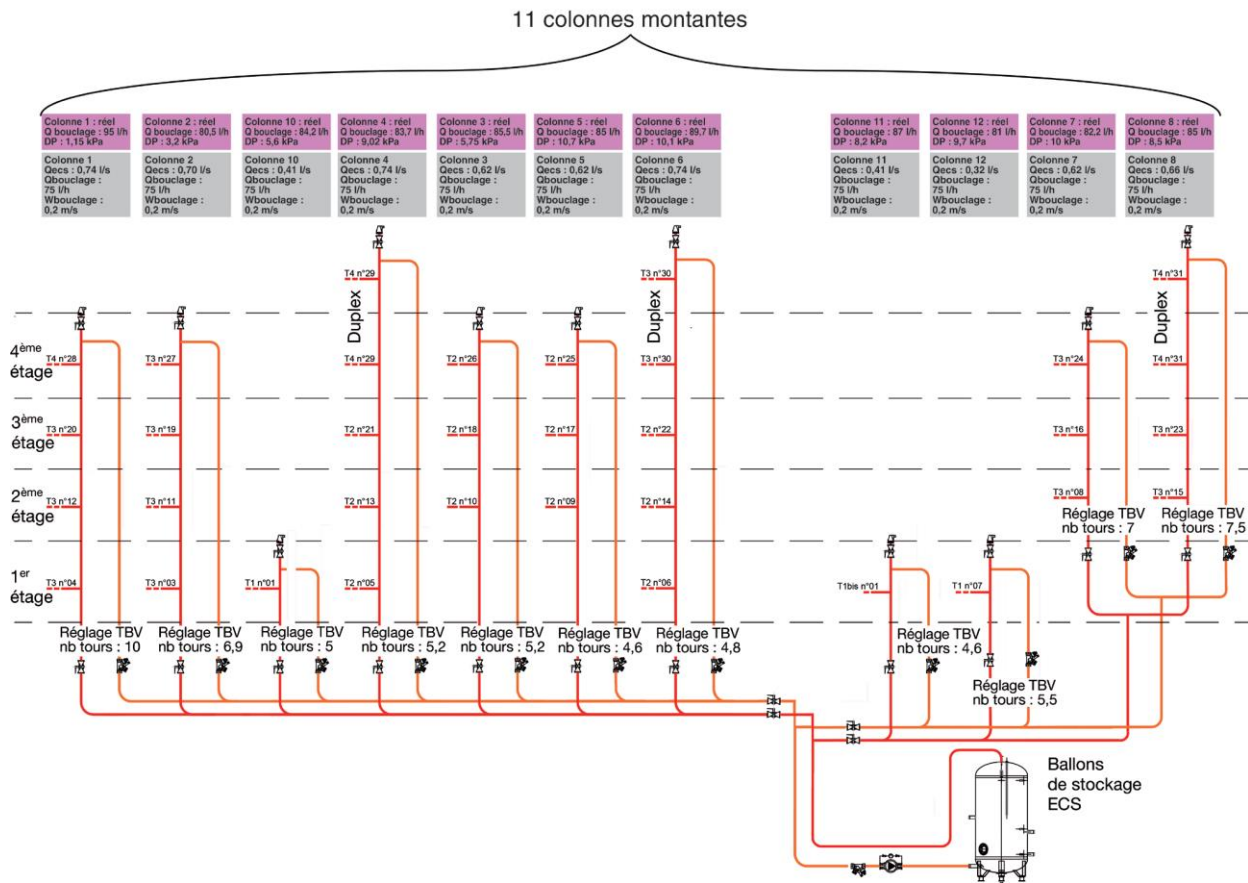
The residence, is a 4-storey building, with 31 luxury apartments (type T1, 14 apartments type T2, 13 apartments type T3 and 3 apartments type T4). The design adopted by GreenCity Immobilier meets the requirements set by the Grenelle de l'Environnement. This regulation guarantees a reduction in the energy consumption of housing which is equivalent, in the Toulouse region, to an average consumption of 50 kWh/m²/year. The solution for this energy performance obtained a 'RT 2012 titre [V operation](#)'. This was ensured by a technical energy installation consisting of:

- Hybrid solar panels to ensure both the production of photovoltaic electricity and the production of domestic hot water.
- Domestic hot water heat pump installed in the technical room in the first basement as well as a technical room in the attic for the inverter and the VMC box.
- Ventilation of the dwellings is ensured by a humidity-controlled single-flow VMC of type B,
- Space heating with individual electric radiant panels.

The residence was delivered in early December 2016 in very good conditions.

Before this realization, the concept had already won the EDF Midi-Pyrénées region prize at the 2015 Silver Pyramids. Aimed at promoting quality, know-how and innovation in construction, this competition is organized by the Federation of promoters French real estate (FPI).

Circulation loop system less than 8 meters



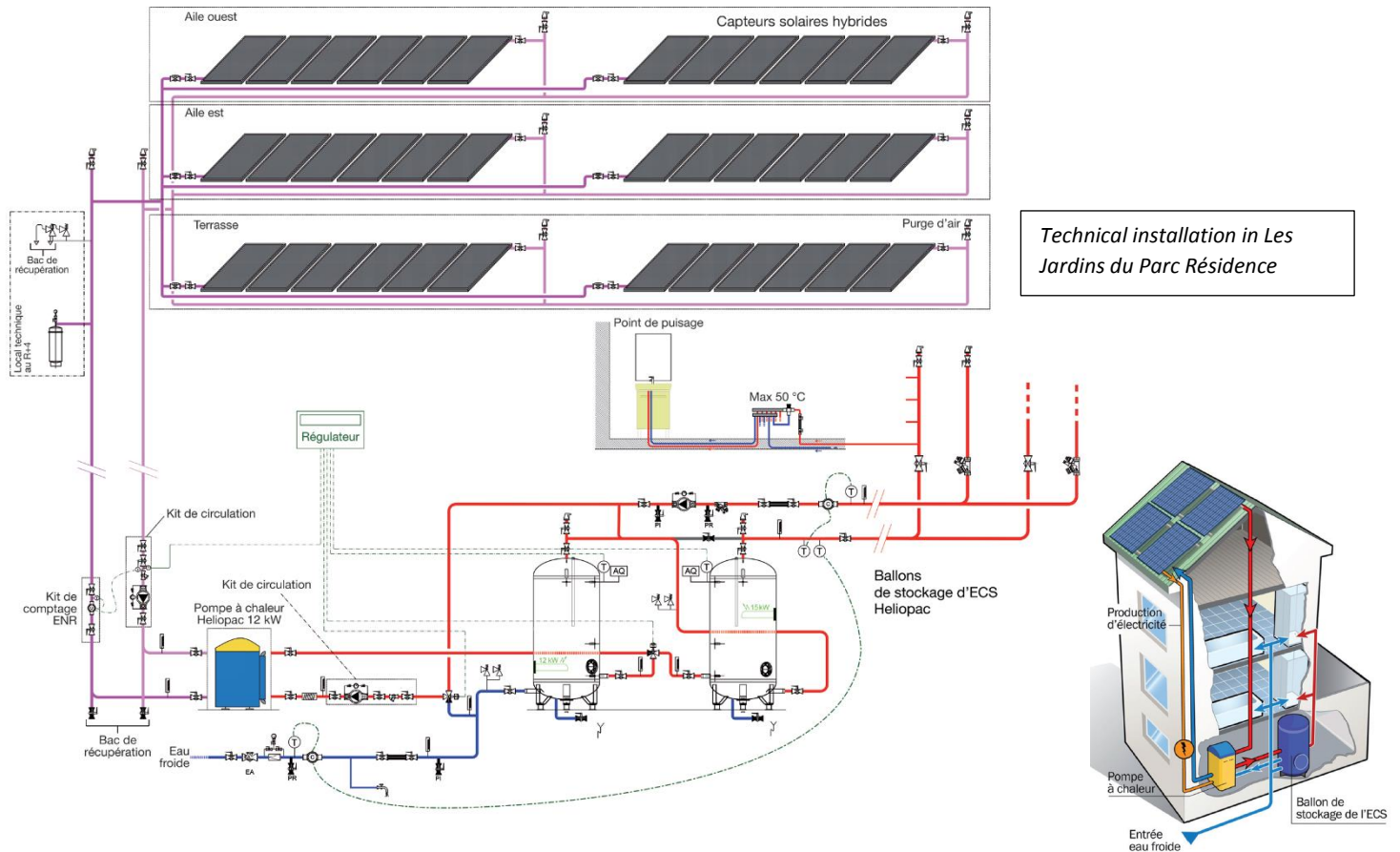
The looped domestic hot water distribution network consists of 11 risers. These are located inside the accommodation in order to limit waiting times at the draw-off points and to comply with the technical rules relating to protection against the development of legionella (length of non-looped antennas less than 8 linear meters and less than 3 liters of water capacity). The distribution loop being maintained at more than 50°C, the

DHW distribution at the entrance of each accommodation is equipped with a thermostatic mixer with anti-scalding safety. Particular care has been taken in the thermal insulation of the looped network as well as in its dimensioning to respect minimum circulation speeds in the loop. The control optimizes the performance of the system and the use of renewable energies through intelligent management of priorities. In particular, it uses the thermodynamic system to produce the thermal energy necessary to compensate for loop losses, and not the electrical back-up. The control is integrated in a factory-mounted electrical cabinet with automata, controls, power contactors, energy meters and modem for remote control and maintenance assistance.

PVT System

Photovoltaic production includes a set of 36 hybrid solar panels for a total surface of 60 m² and a peak power of 9 kW. These panels have the standard dimensions of a conventional photovoltaic panel (60 6-inch cells, high-efficiency monocrystalline silicon cells). The cells are cooled by the circulation of glycol water in the atmospheric heat exchanger. Lifespan: 30 years. Guarantee: 10 years. The panels are divided into 3 separate fields, 2 fields located on an inclined roof (prepainted sheet steel roof for standing seam roofing, type PLX) and 1 field on the roof terrace of the central entrance building. The 3 fields have the same south orientation, with an inclination of 22° on the roof and 6° on the roof terrace. The dimensioning of the collector surface results from an optimization between the surface necessary for good efficiency of the heat pump and the minimum photovoltaic production surface to reach the desired RT performance level.

Les Jardins du Parc Résidence, Toulouse, France, Technical details



Description of the technical concept

The installation consists of factory-assembled components ready to be connected in order to facilitate installation and reduce installation costs. For the collective domestic hot water production part, it includes a heat pump, two storage tanks, a hydraulic module, a regulation. The water/water type heat pump develops only 12 kW of electronically regulated thermal power. High temperature, it produces water up to 65°C. It is equipped with electronic capacity regulation.

DHW storage consists of 2 tanks of 2,000 liters each connected in series. They are fitted with specific taps suitable for dynamic stratification. The volume of the stock, determined by the daily need and the drawing profile of the building, was voluntarily oversized in order to optimize the use of electricity from photovoltaic production for the regeneration of the DHW stock during the day. The tanks are each equipped with an electrical resistance heater, one for back-up and the other only for emergency operation.

Manufactured in the factory, the hydraulic module manages the dynamic stratification of the tanks via a set of 3-way valves and ensures the circulation of the thermal fluid (brine) between the roof sensors and the heat pump evaporator.

A logic of self-consumption of electricity. The PV installation is not of the "built-in" type. It cannot therefore benefit from a subsidized electricity feed-in tariff in the event of a total resale of production. Consequently, the choice of the valuation of electricity naturally turned towards self-consumption because this option makes it possible to:

- Promote self-consumed electricity at a higher price per kWh than resale without integration.
- Overcome the annual rental cost of the two Enedis resale and non-consumption meters.
- Simplify management for the future co-ownership: no purchase contract with EDF, nor distribution of the revenue from the resale of electricity.

