



The Nef, a social renovation project to high architectural and energy standards

PROJECT OVERVIEW

In 2006, the developer Art Prom launched this project to renovate the former sorting centre of the Tours post office, destined to be demolished. The project offers a net surface area of 13,000 sqm divided equally between commercial activity and housing:

- > 52 low-cost housing units including
- > 10 houses on the roof (a net floor area of 4500 sqm)
- > 29 OPAC (French Public Office for Development and Construction) social housing units (a net floor area of 2000 sqm)
- > Offices open to the public (a net floor area of 6500 sqm)

The original building was a parallelepiped: 100 m long, 25 m wide and 18 m high. The design of its reconfiguration aims to give rhythm to the ensemble and to include open spaces in a previously enclosed



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structure. The block was therefore split into two lengthwise, adding a large circulation structure that brings together all the common areas between the two sections.

The “Nef” building therefore owes its name to this vast central covered area that will house all the passageways leading to both the offices and housing.



THE FIRST POSITIVE ENERGY BUILDING OF THIS SCALE IN THE CENTRE REGION

A STRONG COMMITMENT ON THE PART OF THE DEVELOPER, SUPPORTED BY OUR EXPERTISE

The developer Art Prom was extremely keen to construct its first positive energy building (BEPOS). It seized the opportunity to use the existing building structure so that it could focus the majority of its investment on the systems, in order to fulfil the requirements of the BEPOS positive energy building certification. The developer wanted to learn from this flagship operation, before going on to develop other positive energy buildings in the area.

The project is part of the call for bids launched in 2010 by the Centre region and ADEME entitled "Energy Efficiency in buildings". In the call for bids, ADEME provides a methodology that makes sure the projects are indeed energy positive buildings.

The plan is to monitor energy consumption over the two years

following delivery of the operation.

After these two years, if the results obtained meet ADEME's criteria for obtaining BEPOS status, a subsidy will be granted by the institution.

Pending the future BEPOS certification, and as a minimum, housing must meet the criteria of the "Patrimoine Habitat et Environnement" and "BBC-effinergie" certifications. The renovated building is also aiming for HQE (high environmental quality).

To achieve the efficiency of a positive energy building, Egis has successfully designed and calibrated innovative facilities.

An innovative geothermal heating and cooling system

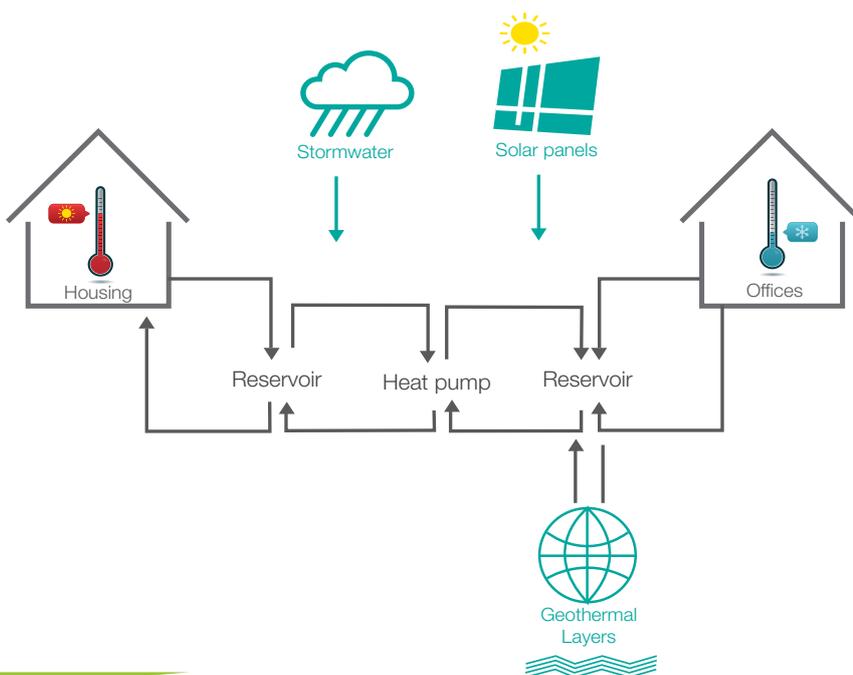
The EPC and project management teams have decided to use geothermal energy and to produce the least

amount of cold possible.

Drilling for geothermal energy has now reached 60m deep. It allows for a flow rate of 22 m³/hr with water at 16°C. It is then stored in a 140 m³ tank and supplies three water-water heat pumps. These pumps operate either together or independently to produce water at 45°C for heating and at 65°C for hot water.

The system is used to heat the housing units, while the cold is stored in the 140 m³ tank. This cools offices via radiant ceiling equipment. This principle helps achieve a satisfactory comfort level without air conditioning (as the offices face east).

This makes the most of the multi-functional nature of the building, using heat on one side and cold on the other.



Operation Planning:

Start of project management studies: September 2010

Start of construction: November 2011

Delivery in installments beginning 2014.

Parties involved

Project owner: Art Prom

Design: Boille & Associés architectes, in consortium with Egis in Tours. The thermodynamic simulation studies were conducted by Effilios.

PMC designated by Ademe: Amoes

ADAPTING TO THE CONSTRAINTS OF GEOTHERMAL ENERGY

Jérôme Diot, project manager at Egis, responsible for the design of the fluids and energy elements of the Nef project explains that “the greatest technical challenge of the operation was calibrating the energy storage and geothermal energy, in order to find the right balance. This task was further complicated by the fact that the initial studies for drilling had provided for a much shallower geothermal well, to obtain a rate twice as high. Results from the first drill therefore led Egis to review all its thermal calculations and hypotheses to work out how a way to always meet the building’s needs in terms of heat and cold. Following this new design, two additional heat pumps (air-water) were added, as a backup installation.”

Harvesting the sun

On the west side of the Nef, the roof terrace is taken up by high quality triplex houses. These houses, as well as the roofing on the Nef, consist of a series of “shed”-type (sawtooth) roof panels, facing south. On the roof surface, 1600 sqm of photovoltaic panels have been installed.

This system is expected to produce

approximately 239,200 kWh of energy per year. Added to the renewable energy generated by the geothermal system, it should cover all the building’s energy usage.

The building’s “self-consumption” of the energy it produces is a key principle for the developer. However, so far, it is financially and technically more beneficial to sell this energy to EDF, rather than consuming it directly. As such, the building currently works on a mixed system, using a routing principle: supply of common areas for lighting, ventilation and lifts with the electricity generated, and the remainder is sold to EDF.

Eventually, Art Prom would like to see its building disconnected from the EDF electricity network and become completely autonomous. It will then need to be able to store energy. The introduction of charging stations for electric cars is a first solution to move towards this goal.

Monitoring performance

The building’s energy performance will be monitored by GTB with an internet portal allowing each resident to track their own energy consumption in real time. Prospective purchasers will also have access to practical information on energy consumption, and can compare their actual use with the

target consumption of the housing. In the event of over-consumption, it will be possible to contact the operator to find out how to rectify your energy behaviour. Moreover, building signage set up in the Nef’s public areas will give information on the overall energy consumption of the building.

Key elements of the project

- > Companies’ commitment to BEPOS certification was a key decision-making criterion.
- > The challenges of energy efficiency were explained to the work teams
- > It was necessary to be adaptable because of the changing needs, such as housing a radiology practice in areas originally destined as offices required more cold.



Before/After. Boille et Associés Architectes



ENERGY EFFICIENCY AND MUCH MORE BESIDES

Good intermodal transportation

The Nef is located at the very centre of the city of Tours: situated on the new tramline, and within 3 minutes walk of the central station, making it just 1 hour by train from Paris. This privileged location will facilitate travel for future residents and encourage them to use their cars more reasonably. Especially as bike garages, protected from car traffic, have been incorporated into the building.

This strategic location within the city also gives a boost to the communications campaign launched to promote the Nef.

Roof rainwater harvesting and vegetated façade

This project intends to harvest rainwater from the roof for household use. A totally separate network of non-potable water has been created within the building for channeling rainwater in order to supply toilets and water the vegetated façade. The main function of this green wall is to cool the building naturally during the summer.

A “concrete-free” building site

The project is based on the use of the existing building’s original concrete

structure. In addition, all the insulating components and the frames of houses on the roof terraces are made of wood. As such, the project has been achieved with an almost total lack of concrete, which has greatly limited CO₂ emissions.

“Building instructions” provided to future residents

Art Prom organised and hosted several meetings with future residents to tell them about the Nef’s energy system and to explain its operation. They were also given a booklet of “green behaviour”.

In addition, Jérôme Diot says that Egis has put forward the idea of creating websites to optimise use of the building as well as interactions between residents. For example, a website encouraging carpooling among neighbours has been considered.

Pyramide d’argent 2012

The Nef project received the Silver Pyramid award in 2012. It was awarded by the French Federation of Property Developers (FPI) for its aesthetic and environmental performance. It is the first rehabilitated industrial wasteland that meets the requirements of the RT2020.



For more information:

Visit the Nef in 3D at
www.artprom.fr/lanef/



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