


## The Plantier in Chateauneuf

by Youness Hssaini / 2019-05-28 17:09:11 / France / 5391 / FR

New Construction



Primary energy need :

## 124.5 kWh<sub>ep</sub>/m<sup>2</sup>.an

(Calculation method : RT 2012 )

**ENERGY CONSUMPTION**

*Economical building* *Building*

< 50	A	A
51 à 90	B	
91 à 150	C	
151 à 230	D	
231 à 330	E	
331 à 450	F	
> 450	G	

*Energy-intensive building*

**Building Type** : Other building  
**Construction Year** : 2017  
**Delivery year** : 2017  
**Address 1 - street** : 75 Route du Village 06740 CHÂTEAUNEUF, France  
**Climate zone** : [Csa] Interior Mediterranean - Mild with dry, hot summer.

**Net Floor Area** : 1 400 m<sup>2</sup> SHON  
**Construction/refurbishment cost** : 1 500 000 €  
**Cost/m<sup>2</sup>** : 1071.43 €/m<sup>2</sup>

Proposed by :



### General information

#### An ambitious project

Between Cannes and Grasse, the village of Chateauneuf is perched on the heights of the hinterland.

The wish of the municipality was to build a sports pole (dojo, yoga room, club house) near the tennis courts and a collective preparation kitchen and a school canteen in connection with the village school. In addition, the municipality regularly organizes outdoor cultural and sports events. A space free of any construction has been planned to meet this demand.

#### Energy is precious: let's get it back!

Create electricity for your own consumption while recovering lost energy: It was the desire of the municipality. And for this multifunctional complex: LA SALLE LE PLANTIER, it has become the challenge of project management. The idea: to valorize any heat source lost and of course to create electric energy thanks to micro-cogeneration.

Resolutely modern with its green roof, the building fits perfectly into its environment. Its characteristics: Architectural Design, Environmental Discretion and Energy Efficiency.

The building has been designed to achieve the level of energy performance corresponding to RT2012.

Its multi-use character however imposes different thermal calculations by zone. In addition, some systems installed do not have the title V. And finally, other facilities, such as the central kitchen, penalize the overall consumption of the building. At this stage, the BEPOS qualification is not reached. But no matter, the bet is won, refrigerators and cold groups consume the electricity produced and we recover heat for heating and DHW ...

#### **Generate electricity and recover heat: Focus**

The Daschs Engine, produced by SENERTEC, is an internal combustion engine (IC) with a condensing device. This piston engine (fuel: natural gas) converts thermal energy into mechanical energy. A generator coupled to the motor converts mechanical energy into electrical energy.

These two transformations simultaneously induce a release of heat (called fatal heat).

Heat is recovered for heating and hot water production.

The overall efficiency of the motor can reach 90% thanks to the condensation device. Powers produced:

- Electric Power: 5.0 - 5.5 kw
- Thermal Power: 14.3 - 14.7 kw

In addition, a 170 kw natural gas condensing boiler, De Dietrich brand, provides thermal support.

Everything is connected and controlled remotely via internet interface. But we also recover the lost heat:

#### **On air vector:**

The air handling unit is double flow: The exhaust air preheats the fresh air.

#### **And on water vector:**

Via the evacuation of waste water from the showers and on the heat released by the condensers of the cold rooms: all this waste heat preheating the ECS.

Finally, the dishwasher is equipped with a condenser that preheats the water it uses.

## Architectural description

### SITE AND PROGRAM

Between Canes and Grasse, the village of Châteauneuf-de-Grasse is perched on the hills of the hinterland.

The proposed site is located on a car park at the entrance to the village, close to the elementary school and sports fields. Its topography has a slight slope. It is bordered by the intersection of two roads in the upper part and tennis courts in the lower part.

The aim of the commune was to build a sports centre (dojo, yoga room, club house) near the tennis courts as well as a collective preparation kitchen and a school canteen in connection with the village school. In addition, the municipality regularly organises cultural and sporting events outdoors. A space free of any construction had to be provided to meet this demand.

### DEVICE AND PROGRAMMATIC MIXIT

The project is in an "L" shape in alignment with existing roads. It flirts with the constructible limit of the land, closing off the space and generating large external courtyards.

We took advantage of the natural gradient of the terrain to manage the programmatic mix,

The project is set up on the slope, is on two levels and has two distinct volumes, accessible on one level.

The kitchen and school canteen as well as the clubhouse are located in the lower part of the volume and form the lower part of the project. This forms a stone-bound base and connects the project to the ground, in continuity with the stone retaining walls that mark the village's landscape.

The clubhouse's flat roof generates an entrance square for the floor program related to sports activities (dojo and dance hall).

This white volume, which is not very well drilled, is placed over the stone sub-basement and creates a play of contrast while emphasizing the contemporary aspect of the project.

The entire structure is made of in-situ concrete. Acting as a bracing system. The transverse walls are designed according to the programmatic elements of the floor.

The ground floor is insulated from the inside and covered with local stone cladding, while the second floor receives thermal insulation from the outside.

Without any demonstration, we have taken advantage of the constraints without getting into the exceptional.

### SUSTAINABLE DEVELOPMENT AND ENERGY SAVING

The municipality of Châteauneuf, in its desire to create an exemplary building, has opted for the implementation of four innovative technical solutions in order to optimize the building's energy consumption.

Gas micro-cogeneration: Due to the high and constant electricity requirements for refrigeration equipment, and the mixing of the various building rooms, a gas condensing micro-cogeneration of 14.7kW thermal and 5.5kW electric has been installed. Almost all the energy produced in this way is consumed on site. This process allows the necessary electricity to be produced at a very low cost, while providing a comfortable basis for the building's heating needs.

Fatal energy recovery: Since the kitchen is equipped with positive and negative cold rooms, the operation of their refrigeration equipment generates a lot of heat loss. To fight against this waste, all these equipments are connected to an innovative energy recovery system that uses this fatal energy for the domestic hot

water needs of the premises.

Double flow air handling units: Given the large air flows required for the renewal of the building's premises, the air handling units are equipped with a double flow ventilation system that recovers heat from the stale and hot air extracted from the inside and transmits it with an efficiency of 90% to the fresh and cold air introduced from the outside.

Wastewater energy recovery: The warm water from the desvestiary showers flows through an exchanger to preheat the incoming water. This innovative system thus makes it possible to recover the energy contained in the wastewater that would otherwise be sent directly to the sewerage system.

## If you had to do it again?

From an energy point of view, it would have been desirable to integrate more powerful cogeneration (10 kWe instead of 5.5 in place).

The building is very successful and has a high utilization rate. The choice of integrating refreshment would have been a good decision to further improve the comfort of users.

## Photo credit

Royalty Free Photos

## Stakeholders

### Contractor

Name : Mairie de Chateauneuf

Contact : Emmanuel Delmotte

<https://www.ville-chateauneuf.fr/>

### Construction Manager

Name : Heams&Michel

<https://heamsmichel.com/>

### Stakeholders

Function : Thermal consultancy agency

Bureau d'étude KLEBER DAUDIN

Monsieur Kleber DAUDIN - 0688521818

Design office design realization

### Type of market

Realization

## Energy

### Energy consumption

Primary energy need : 124,50 kWh<sub>ep</sub>/m<sup>2</sup>.an

Primary energy need for standard building : 154,20 kWh<sub>ep</sub>/m<sup>2</sup>.an

Calculation method : RT 2012

## Renewables & systems

### Systems

Heating system :

- Condensing gas boiler
- Combined Heat and Power

Hot water system :

- Condensing gas boiler

#### Cooling system :

- No cooling system

#### Ventilation system :

- Double flow heat exchanger

<https://www.construction21.org/france/data/sources/users/14162/details-sur-les-systemes-cvac---gsa.docx>

#### Renewable systems :

- Biogas boiler
- Energy recovery from waste
- Other, specify

<https://www.construction21.org/france/data/sources/users/14162/note-technique-kleber.docx>

Since its inauguration, the town hall has chosen to supply the Le Plantier building with renewable gas via a renewable gas supply contract.

#### Solutions enhancing nature free gains :

1 - récupérateurs d'énergie sur les compresseurs des groupes frigorifiques permettent de fournir de la chaleur pour les besoins en ECS des locaux. Plus de 60% des besoins en ECS pourront être couvert par ce dispositif. 2 - Le bâtiment est multi-activités,

## Smart Building

#### Smartgrid :

The municipality of Chateaufort is engaged in a collective self-consumption project at the commune level, aimed at optimizing the energy autonomy of the municipality. Still under study, the bedrock of this reflection was the Plantier, and in particular its local production of green electricity with renewable gas cogeneration

## Environment

### Urban environment

The project is part of an "L" shape in alignment with existing roads. It comes to flirt with the building limit of the ground closing the space and generating large forecourt outside.

We took advantage of the natural slope of the ground to manage the programmatic mix,

The project moved into the slope, spread over two levels and released two separate volumes, accessible on one level.

The kitchen and the school canteen and the clubhouse are located in the lower part of the volume and form the basis of the project. The latter forms a base covered with stones and hangs up the project on the ground, in the continuity of the stone retaining walls that mark the landscape of the village.

The roof terrace of the clubhouse generates a forecourt for the floor program related to sports activities (dojo and dance hall).

This very little white volume is placed cantilevered on the basement stone and operates a game of contrast while underlining the contemporary aspect of the project

The entire structure is made of cast concrete. Acting as an exhibition. The transverse walls are framed according to the programmatic elements of the floor.

The ground floor is insulated from the inside and covered with a country stone facing while the floor receives thermal insulation from the outside.

## Products

### Product

Micro-cogeneration with natural gas (biomethane)

De Dietrich / Senertec

Jérôme VIOLLO - jerome.violo@lehubchdd.com

<https://www.dedietrich-thermique.fr/>

**Product category :** Génie climatique, électricité / Chauffage, eau chaude

Micro-cogeneration with Natural Gas (Biogas) - 5.5 kWe - 14.7 kWt

SENERTEC type Dash G / FS

Excellent acceptance, because of the impossibility of putting PV on the roof (subject ABF). Has made it possible to obtain a part ENR and to initiate a reflection on the self-consumption collective.



Natural gas condensing boilers

DeDietrich

Jérôme VIOLO - jerome.violo@lehubchdd.com

<https://www.dedietrich-thermique.fr/>

Product category : Génie climatique, électricité / Chauffage, eau chaude

Condensing boilers Natural gas - 179 kWth

DeDIETRICH type C230-170 ECO

RAS



Dual flow air handling units

AERMEC

<https://global.aermec.com/fr/>

Product category : Génie climatique, électricité / Ventilation, rafraîchissement

Dual flow air handling units

CTA DF for the canteen: AERMEC - Air flow of 4 165 m<sup>3</sup> / h

CTA DF for the tourist office: AERMEC - 1000 m<sup>3</sup> / h airflow

Hygienic DF unit: AERMEC - 1000 m<sup>3</sup> / h airflow

CTA DF for Yoga: AERMEC - Airflow 3000 m<sup>3</sup> / h

CTA for the dojo: AERMEC - Airflow of 4 055 m<sup>3</sup> / h

RAS

Energy recuperator on fridge

BOOSTHERM

<http://boostherm.com/>

Product category :

Energy recuperator on fridge 10 kW & 45 kW

BOOSTHERM RECUP VV 10 kW & 45 kW

RAS

## Costs

### Construction and exploitation costs

Total cost of the building : 1 500 000 €

Subsidies : 1 400 000 €

## Contest

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

The municipality of Châteauneuf, in its desire to create an exemplary building, opted for the implementation of four innovative technical solutions in order to optimize the energy consumption of the structure.

- Gas micro-cogeneration: Due to the large and constant electricity needs for refrigeration equipment, and the mixing of different building premises, a gas condensing micro-cogeneration of 14.7kW thermal and 5.5kW electrical was installed. Almost all the energy produced in this way is consumed on site. This process thus makes it possible to produce the necessary electricity at a very advantageous cost, while providing a comfortable base for the heating needs of the building.
- Fatal energy recovery: The kitchen is equipped with positive and negative cold rooms, the operation of their refrigeration equipment generates a lot of heat loss. To combat this waste, all these equipment are connected to an innovative system of energy recovery that restores this energy fatal for the hot water needs of the premises.
- CTAdouble-flux: Given the high flow rates required for the air renewal of the building premises, the air handling units are equipped with a dual-flow ventilation system that recovers the heat from the exhausted and hot air extracted from the inside to transmit it with a yield of 90% to fresh air and cold introduced from the outside.
- Wastewater energy recovery: The warm waters of the vestibule showers circulate through an exchanger to preheat incoming water. This innovative system allows to recover the energy contained in wastewater that would, without this device, sent directly to the sewerage network.

## Building candidate in the category



Bas Carbone



Prix du public



Prix des Etudiants

