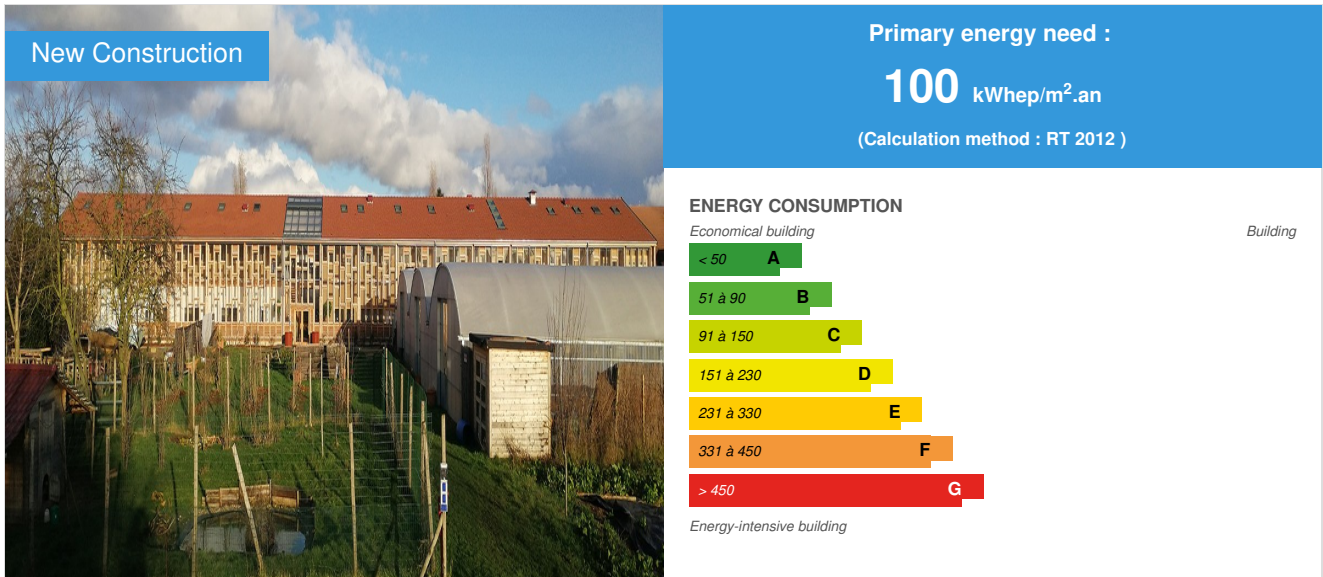


## Resilience - The farm of possibilities

by Frederic Denise / 2021-05-27 00:00:00 / France / 8760 / FR



**Building Type** : Other building  
**Construction Year** : 2019  
**Delivery year** : 2020  
**Address 1 - street** : 29 Rue d'Amiens 93240 STAINS, France  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 1 883 m<sup>2</sup>  
**Construction/refurbishment cost** : 3 072 000 €  
**Cost/m2** : 1631.44 €/m<sup>2</sup>

### General information

Résilience is the head office of Novaedia, a work integration cooperative that develops a local, organic and solidarity food loop. It was built on La Ferme des Possibles in Stains (93).

In line with the cooperative's practices, inspired by permaculture and in symbiosis with its surrounding area, the building was conceived in a bioclimatic way with bio / geo-sourced materials and reused materials. It reconciles a low-tech and high-tech approach within a single building: waterspout walls and raw earth plasters rub are combined to a kitchen-laboratory and a heat-fridge-pump.

The building has a wooden structure, glued laminated porticoes and CLT floors, made with wood from French forests. The insulating facades, interior and exterior, are made up of prefabricated wooden boxes filled with compressed straw and plastered with raw earth on both sides.

The glazed facades are made with single-glazed wooden windows, retrieved from the thermal renovation of a social housing complex in Epinay-sur-Seine, less than 4 km from the site.

The soil from the spoil was used to make the finishing plasters, by mixing it with cellulose fiber from the packaging boxes on the site. This earth is also present in the cafeteria bar, mixed with crushed concrete to make adobe walls. These mixtures avoided adding sand to stabilize this very clayey soil.

Many reuse materials have been used in the construction and equipment of Resilience. Their origins are multiple: Bellastock, Urban Metabolism, Réavie, Bon Coin, the City of Paris or gleaned by the companies themselves on their renovation sites.

The solar gains are favoured by buffer spaces and a waterspout wall. Given the large presence of refrigerated premises, the heated spaces benefit from a thermofrigopump, thus recovering the energy used to produce cold to heat the premises.

## Sustainable development approach of the project owner

The approach of the Novaedia cooperative is based on permaculture. It is not only a question of how to cultivate, but above all of associating the existing human resources and energies in the area, making them work together to bring about new practices, adapted to the world to come. Hence the name Resilience.

Novaedia's environmental approach is consistent with these principles and its commitment to integrating people excluded from the working world. The raison d'être of Novaedia is indeed to foster a social and solidarity economy in working-class neighborhoods to develop eco-activities, by allowing the support and training of disabled workers and young inhabitants towards promising professions.

Its know-how is to reconcile local development, sustainable development and professional integration, according to the idea that the resources of some meet the needs of others and that waste does not exist. La Ferme des Possibles aims to become an educational showcase to build awareness of permaculture and sustainable development.

Thanks to the construction of Resilience and the developments of La Ferme des Possibles, Novaedia aims to make it an experimental urban farm, which aims to be replicated in all urban areas. The objective is to demonstrate that a plot of approximately one hectare is sufficient to accommodate orchards and vegetable gardens, greenhouses, central kitchen, logistics and restaurant. But also by associating it with neighboring farms, local players in the social and solidarity economy, local communities and residents, a dynamic of citizen mobilization can be initiated around the issues of food, environment and biodiversity in working-class neighborhoods while creating jobs for the future.

## Architectural description

Résilience houses logistics and production premises on the ground floor: storage, packaging, kitchen laboratory and a cafeteria. The first floor accommodates offices, training and meeting spaces.

The architectural aspect is a volume of great simplicity, inspired by a farmhouse, in reference to its agricultural vocation, totally transparent on its most exposed facades, making its materiality obvious: reuse, wood, earth and straw .

Distribution constraints within this complex culinary preparation laboratory program overlap perfectly with bioclimatic principles. Only a narrow strip of land was constructible, oriented north-south. This linearity is fairly consistent with the program, which results in a sequencing of functions. From the receipt of food to the delivery of meals, a series of operations induces this sequencing, following a forward march; from the reception of foodstuffs to the distribution of finished products, without crossing. The plan was therefore designed with a double peripheral circulation, making it possible to irrigate the premises in a simple and functional way, without crossing clean and dirty circuits. These unheated distribution spaces, on the outskirts of the building, form buffer spaces, lit by glazed facades in re-used joinery. The interior facades housing the heated premises are made of wooden boxes filled with compressed straw, covered with a mud plaster on both sides. The southern end of the chain houses the restaurant.

The south gable is treated as a waterspout wall, made of reused BTC bricks (from the Ville des Terres of BELLASTOCK). Surrounded by the gardens of the neighboring pavilions, it heats, cools and illuminates the restaurant while preserving the privacy of the place.

## Building users opinion

Resilience occupants are proud of their building. However, they sometimes regret the temperature in the buffer spaces in winter when there is no sun! We have perhaps not communicated enough on the conditions of use of such a space, which is to be considered as an outdoor space, sheltered from rain and wind, which can participate in the heating of the building, but only on sunny days ...

## If you had to do it again?

If it had to be done again today, it would be zero concrete! Since we have found a way to not use concrete foundations, thanks to screw piles supporting a wooden floor. Then, the glazed facades of the buffer spaces would be double glazed and not single glazed.

## See more details about this project

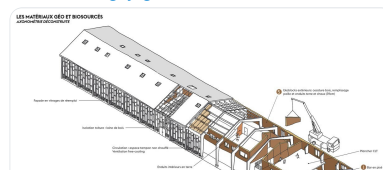
<https://topophile.net/faire/la-ferme-des-possibles-ou-de-la-serendipite/>

<http://materiauxreemploi.com/visite-de-chantier-resilience-la-ferme-des-possibles-a-stains/>

[https://www.bellastock.com/projets/resilience/?fbclid=IwAR35d8sy4CZpBAIq\\_0JgnOClyFIO4h58VdCd2Y\\_MMwdxdmPRJwg8jogcLNk](https://www.bellastock.com/projets/resilience/?fbclid=IwAR35d8sy4CZpBAIq_0JgnOClyFIO4h58VdCd2Y_MMwdxdmPRJwg8jogcLNk)

## Photo credit

Photo credit: Archipel Zéro



## Stakeholders

## Contractor

Name : Novaedia

Contact : Mohamed Gnbaly

## Construction Manager

Name : Archipel Zéro

Contact : Frédéric Denise

<http://www.archipelzero.fr>

## Stakeholders

Function : Other consultancy agency

BELLASTOCK

Clara Bergia

<https://www.bellastock.com>

Assistant MO Reuse

---

Function : Company

Depuis 1920

Nathan Levinson

<https://depuis1920.fr>

Mainly the realization of curtain facades in reused windows

---

Function : Company

DALKIA FROID SOLUTION

Christian Rabin

<https://www.dalkiafroidsolutions.com>

HVAC company, thermo-fridge-pump

---

Function : Environmental consultancy

Réavie

Mohamed Hamaoui

<http://asso-reavie.fr>

Supply of reuse plumbing equipment

---

Function : Company

Bois 2 Bout

Benoît de Bellefonds

<http://www.bois2bout.fr>

Timber frame, CLT floors, Installation of prefabricated wooden boxes with straw insulation (Ekobloks)

---

Function : Company

AF Rénovation

Hakim Fernane

Carpentry-placo, supply and installation of re-use materials: interior double-glazed windows and cast iron radiators

A Coeur de Chaux

Georges Bodnar

<http://www.acoeurdechaux.com>

Lime-plaster renderings on exterior earth renderings

---

Function : Company

Terraterre

Franck Lamy

<http://www.terraterrre-hautemarne.com>

Implementation of BTC bricks

---

Function : Manufacturer

Rainbow Ecosystem

Raphael Petit

<https://rainbowecosystem.com/fr/>

Realization of Ekobloks, prefabricated wooden boxes filled with compressed straw and coated on both sides with a raw earth plaster

## Contracting method

Separate batches

## Type of market

Global performance contract

## Energy

### Energy consumption

Primary energy need : 100,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

Primary energy need for standard building : 157,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

Calculation method : RT 2012

Breakdown for energy consumption : Heating 45.40 / Lighting 52.50 / Auxiliary 2.60

### More information

Unknown to date. As the building has a large part of its premises refrigerated, and unheated buffer spaces, the RT 2012 calculation is unsuitable.

## Renewables & systems

### Systems

Heating system :

- Heat pump
- Water radiator
- No heating system

Hot water system :

- Heat pump

Cooling system :

- Reversible heat pump
- Others

Ventilation system :

- Free-cooling
- Single flow
- Double flow heat exchanger

Renewable systems :

- Heat pump

Solutions enhancing nature free gains :

Espaces tampons, murs trombe

## Environment

### Urban environment

Land plot area : 13 000,00 m<sup>2</sup>

Built-up area : 7,00 %

Green space : 10 500,00

The Ferme des Possibles site is surrounded by large urban areas: facilities, business area and residential area. By its size, its shape and its materiality, the building fits into this peri-urban context at the articulation of these 3 zones.

The footprint of the building, approximately 1000 m<sup>2</sup>, and its length of 70 m are consistent with the dimensions of the Bois Moussay business area and the large surrounding facilities (high school, clinic, etc.) while its shape, its orientation and materiality, with its eastern facade in white plaster and its terracotta-tiled roof bring it closer to the nearby pavilions.

The implementation of the project was very constrained, because the land as an agricultural zone was not constructible, except on a narrow north-south oriented strip, in continuity with the residential area, on which the program was just fitting. This long configuration was exploited to integrate a sequencing of the premises, materializing a step forward in the processing of foodstuffs.

## Products

### Product

Dalkia froid solutions

<https://www.dalkiafroidsolutions.com/>

Product category : HVAC, électricité / ventilation, cooling



## Costs

### Construction and exploitation costs

Reference global cost : 1 800,00 €

Renewable energy systems cost : 499 000,00 €

Reference global cost/none : 1800

Cost of studies : 210 000 €

Total cost of the building : 3 285 000 €

Additional information on costs :

The total cost includes a heat pump and the production of cold for laboratories (kitchens and production space), which considerably increases the ratio per m<sup>2</sup>. Without this equipment, the price of the building is around 2,600,000 € / m<sup>2</sup>

## Circular Economy

### Reuse : same function or different function

Batches concerned by reuse :

- Structural works
- Structural framework
- Indoor joineries
- Outdoor joineries
- Partitions
- Electricity
- Heating ventilation air conditioning
- Plumbing
- Landscaping
- others...

For each batch : Reused Materials / Products / Equipments :

**Big work:**

- BTC mud bricks
- Excavated earth reused as plaster, fiberized with the site's cardboard packaging, and adobe bar mixed with crushed concrete

**Framing:** Joist offcuts reused as stair treads

**Exterior wood furnishings :**

- Single-glazed windows reused as a glazed facade
- Double glazed windows reused as interior windows between buffer space and heated rooms

**Partitions:** reusable mobile partition

**Interior joinery:** re-used glass doors

**Electricity:** reuse of lights, and reuse of the cooperative's baskets as lampshades

**Plumbing:** WC and reuse hand basin

**HVAC:** Reuse cast iron radiators

**Others:** Acoustic baffles, plant furniture ...

#### **Outdoor Facilities :**

- reused granite pavers for outdoor terraces
- site pallets reused as benches and outdoor tables

#### **Reused materials rate :**

The mass of the building, excluding the foundations and low concrete floor, is **570.1 tonnes** .

The mass of re-used materials forms a total of **72.24 tonnes, or 12.67%**

- re-used single-glazed wooden windows: 450 m<sup>2</sup>
- wooden double glazed windows: 60 m<sup>2</sup>
- mobile partition: 11 m<sup>2</sup>
- glass re-use doors: 14 units
- cast iron radiators: 42 units - 100%
- plumbing equipment: 14 - 100%
- suspended luminaires: 60 - 100%
- BTC bricks: 6000 units, 125 m<sup>2</sup>
- joist offcuts 5x15 cm for stair treads: 140 ml
- granite paving stones: 140 m<sup>2</sup>

#### **Field of use and material origin :**

- BTC mud bricks reused to make a waterspout wall, sold by Bellastock, from the Ville des Terres
- Excavated land reused in situ as plaster and rammed earth
- Cardboard packaging from the site reused in situ to fiberize the earth plasters
- All-terrain in crushed concrete, resulting from demolition, bought at Point P in Saint-Denis for the realization of the adobe wall of the bar
- Joist offcuts reused in situ for stair treads
- Single glazed windows sourced by Bellastock, resulting from a thermal renovation in Epinay-sur-Seine, reused as a glazed facade
- Double-glazed windows reused as interior windows between buffer space and heated premises, supplied by the company, from various cleanings and the Bon Coin
- Reusable mobile partition, from the ENGIE site in Saint Denis, via Métabolisme Urbain
- Reused glass doors, from the ENGIE site in Saint Denis, via Métabolisme Urbain
- Lighting from the ENGIE site in Saint Denis, via Urban Metabolism
- Fruit baskets from the cooperative reused in-situ as lampshades
- WC and hand basin provided by the Réavie association
- Cast iron radiators gleaned from the Bon Coin
- Acoustic baffles and cafet furniture from the ENGIE site, via Métabolisme Urbain
- Granite pavers reused for the outdoor terraces, supplied by the City of Paris
- Worksite pallets reused in-situ for benches and outdoor tables

## **Environmental assessment**

#### **Impacts avoided : water, waste, CO2 :**

On reused materials: toilets, sinks, windows, doors, radiators, light fixtures, bricks, joists, paving stones and removable partitions, the impacts avoided are as follows:

- o 69.22 tons eq CO2
- o 763.3 m3 of water
- o 88 tonnes of waste

(Calculations based on environmental data from the INIES database)

## Economic assessment

Total cost of reuse : 21 400 €

Cost of reuse in percentage of the operation : 1 %

Saving realised thanks to the implementation of reused materials compared to new materials : 107 000 €

## Social economy

Social economy and professional integration :

The client is a professional integration cooperative. It was natural that the construction of its tool should be part of a social and solidarity economy approach.

The use of local businesses and local suppliers has been favored.

The finishing coatings on the straw boxes as well as the adobe bar were carried out in a participatory worksite with members of the cooperative, neighbors and volunteers from all walks of life. It was about disseminating virtuous practices, simple to replicate, with abundant materials, available everywhere, without damage to the environment; that is to say economically sustainable practices, which will gradually replace harmful practices for the environment and will constitute the professions of tomorrow.

## Contest

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

- Réemploi
- Bio/géosourcé
- Chantiers participatifs

### Building candidate in the category



Prix du public

