


Dethy - Belgium

by Lionel Bousquet / © 2023-05-24 09:18:46 / France / © 221 / FR



Primary energy need :

24 kWhep/m².an

(Calculation method : Other)

ENERGY CONSUMPTION

Economical building

< 50	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 **A**

Building Type : Collective housing > 50m
Construction Year : 1865
Delivery year : 2021
Address 1 - street : 3 rue Dethy 1060 BRUXELLES, Belgique
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 280 m² Autre type de surface nette
Construction/refurbishment cost : 385 090 €
Number of Dwelling : 2 Dwelling
Cost/m² : 1375.32 €/m²

General information

The DETHY project consists of an elevation and energy renovation of a single-family house in Saint-Gilles (1060), Belgium, following the principles of the circular economy. It is based on the following 4 pillars:

1. Eco conception;
2. Use of BIM and digital tools;
3. Objective of passive renovation;
4. Application of circular economy principles.



If you had to do it again?

Synthesis and feedback

One of the initial working hypotheses was that the 4 pillars that support the project work concurrently and bring more than if they were applied in isolation. It can be seen that having tackled these subjects head-on while maintaining rigor in management has made it possible to meet their respective objectives.

A logic to refine

The fairly long duration (2015 - 2021) of the project has allowed many experiments and maturations on how to approach energy renovation with increasingly constrained resources. The end of the project also coincided with the launch of RENOLUTION across the Brussels region. In connection with the objectives of carbon neutrality by 2050, this raises the following question: how to renovate energy in a circular approach 200,000 buildings (or 600,000 housing units)?

The equation is complex because there is obviously a lack of strength and skills at the level of companies and project managers. Not to mention the motivation and budgets of the clients. In this context, the experience of this project allows us to draw the following conclusions:

- To consider large-scale renovations, one must have an extensive but detailed "building knowledge".
- The need for maximum maintenance of the building demonstrates the importance of the inventory.
- This allows each building to have a starting point for a renovation project.
- It is necessary to speed up the renovation process, both in terms of studies and their implementation.
- In this context, digital technology can bring productivity gains.
- It must nevertheless be used wisely and not generate too many complexities of use while maintaining its effectiveness.
- Reuse is a flow of atoms that requires rigorous organization and planning

See more details about this project

https://environnement.brussels/sites/default/files/user_files/f04_eccr_211019_1_6_dethy_fr.pdf

<https://fr.focusarchi.eu/interviews-architecture/projet-dethy-avec-lionel-bousquet>

BIM approach

See the explanations in the attached file in the SOLUTIONS section

Photo credit

Stephanie Roland + BXMLRS

Stakeholders

Contractor

Name : Privé

Construction Manager

Name : BXMLRS

Contact : Lionel Bousquet

<http://www.bxmlrs.com>

Type of market

Not applicable

Other type of market

Private

Allocation of works contracts

Separate batches

Energy

Energy consumption

Primary energy need : 24,00 kWh/m².an

Calculation method : Other

Breakdown for energy consumption :

- Heating: 5,957 Kwh/year
- DHW: 3,421 kWh/year
- Auxiliary needs (ventilation / lighting / household appliances): 1,058 Kwh/year

Initial consumption : 560,00 kWh/m².an

Real final energy consumption

Final Energy : 30,00 kWh/m².an

Envelope performance

More information :

See the explanations in the attached global file + PHPP

Building Compactness Coefficient : 2,21

Indicator : EN 13829 - n50 » (en 1/h-1)

Air Tightness Value : 1,80

More information

See the explanations in the attached global file.

Non-renewable primary energy consumption

Non-renewable primary energy consumption : 59,80 kWh/m².an

Renewables & systems

Systems

Heating system :

- Individual gas boiler

Hot water system :

- Individual gas boiler

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic

Renewable energy production : 30,00 %

Other information on HVAC :

1 single protected volume.

1 ComfoAirQ 350 DF ventilation with enthalpy exchanger for the living area.

1 DF ComfoD 300 ventilation for the office part on the ground floor.

Possibility of extending the surface of the PS from 5 to 11 panels. Planned in the next 3 to 5 years to remove the gas boiler and add an air/water heat pump.

Environment

Biodiversity approach

- Planting a tree (2 if possible) on the plot
- Greening flat roofs: $15 + 6 + 6 = 27\text{m}^2$

Mitigation actions on soil and biodiversity :

- Restitution of the open ground on the ground floor courtyard (30m²)

Risks

Hazards to which the building is exposed :

- Urban heat island

Risks measures put in place :

- Insulation of the entire envelope from the outside except on the street facade
- U value of walls less than 0.15
- Increase in the thickness of insulation on the roof (40cm)
- Use as much as possible of insulation with a high phase shift (wood wool, wood fiber panels)
- Exterior roller shutter for south-facing roof windows
- Rolling shutter for the office on the ground floor
- Installation of "Nimois rattan" on the 6 frames of the south facade

Urban environment

- Tram station 3 mins walk
- Metro station 6 mins walk
- Gare du Midi station (International traffic) 15 minutes on foot
- 3 car-sharing stations 3/5 minutes away on foot
- Very commercial district, market several days a week
- Cultural dynamics: cultural center, galleries, bookstores

Land plot area : 110,00 m²

Built-up area : 80,00 %

Green space : 30,00

Products

Product

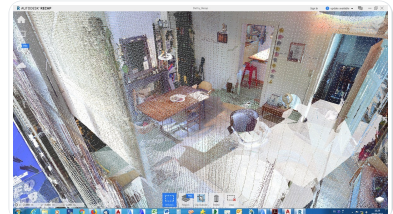
INVENTAIRE SCAN+BIM

FARO et GRAPHISOFT

<https://graphisoft.com/>

Product category : Aménagement extérieurs / Déchets : collecte & valorisation

Use of BIM modeling of an existing building made from a point cloud to identify and quantify FLOW-IN and FLOW-OUT



Costs

Construction and exploitation costs

Renewable energy systems cost : 6 000,00 €

Cost of studies : 42 670 €

Total cost of the building : 427 760 €

Subsidies : 69 540 €

Energy bill

Forecasted energy bill/year : 950,00 €

Real energy cost/m² : 3.39

Real energy cost/Dwelling : 475

Circular Economy

Circular economy strategy

Phase in which reuse has been integrated : Programming

Type of circular economy strategy implemented :

- Maximization of the number of impacted batches
- Maximization of the carbon gain
- Maximization of the mass of waste avoided

Quantified targets for reuse? :

Objectives not initially set. The project has since been integrated into a study panel within the European FCRBE project. Precise data will be available in the publication of this study in the fall of 2023.

Integration of reuse into the written contract documents : Integration of the reuse specifically in the special technical specifications of the concerned batches

Validation protocol for reused materials : No

Validation protocol for reused materials :

Validation of principle at the signature of the contract then by mutual agreement with the companies according to the evolution of the site.

Deposit validation form : No

Reuse : same function or different function

Batches concerned by reuse :

- o Structural framework
- o Facades
- o Indoor joineries
- o Floorings
- o Partitions
- o Isulation
- o Suspended ceilings
- o Raised floors
- o Landscaping

For each batch : Reused Materials / Products / Equipments :

See attached pdf document "reuse summary"

Reused materials rate :

See attached pdf document "reuse summary"

Logistics

Rehabilitation and reconditioning operations (if project concerned by a cleaning/demolition stage) : Yes

Storage of materials for reuse in situ (if project concerned by a cleaning/demolition stage) :

- o On site, on a dedicated area in a covered location
- o On site, on a dedicated area not covered

Storage of materials from external supply :

- o On site, on a dedicated area in a covered location
- o On site, on a dedicated area not covered
- o No problem of storage, supply correlated to the progress of the works

Insurance

Consultation of the technical controller : No

Insurance broker on the project : Yes

Insurance broker : DVV

Consultation of the broker : No

Insurer : DVV

Consultation insurer : No

Environmental assessment

Impacts avoided : water, waste, CO2 :

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Categories	CO2 avoided (kg)	Water consumption avoided (m3)	Waste avoided (kg)
Electrical equipment	122.485459	14.22242039	103.3487273
facades	2994.535	15.62705	5743,358154
False ceilings	769.6557951	11.97912206	1139.961942
Big work	368.64	3,288	468.068424
Insulation	795.0656415	10.53922396	
Interior joinery	166.4	3.73369	281.2294141
floor coverings	71.34160422	15.23834671	147.1042983
	CO2 avoided (kg)	Water consumption avoided (m3)	Waste avoided (kg)

TOTAL	5288.1235	74.62785312	8246,865137
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The reuse operation saved the equivalent of

- 42,305 kilometers traveled by a small car, i.e. 48 Paris-Nice journeys,
- 498 rectangular bathtubs filled with water,
- 16 years of household waste from a Frenchman.

Communication

Communication on the process : Yes

If so, please specify :

- Video : <https://ecobuild.brussels/videos/visite-de-chantier-digitale-dethy/>
- Embuild edit : <http://www.reemploi-construction.brussels/news/article/editeur-du-mois-lionel-bousquet-de-bxlmsr/>
- Interview : <https://vb.nweurope.eu/media/20275/faire-l-inventaire-al-aide-du-bim-pour-mieux-pre-parer-la-de-molition-circulaire.pdf>
- Interview : <https://fr.focusarchi.eu/interviews-architecture/projet-dethy-avec-lionel-bousquet>

Project visit : Yes

Social economy

Social economy and professional integration :

- Raised wooden structure and wooden interior partition made by the Ateliers de l'Avenir: <https://www.amaa.be/engagements/>

Circular design

Responsible consumption :

- Maximum preservation of existing buildings
- Maximum densification authorized by town planning = raising one level
- Creation of an office space on the ground floor

Functionality economy :

Intensive use of a library of tools available in Brussels: TOURNEVIE

- <https://www.tournevie.be/english#our-offer>
- <https://youtu.be/8vEFmItTUY>

See attached PDF with borrowed tools

Industrial and territorial economy :

- Many exchanges and reuse flows (Flow-in and flow-out)

See attached PDF

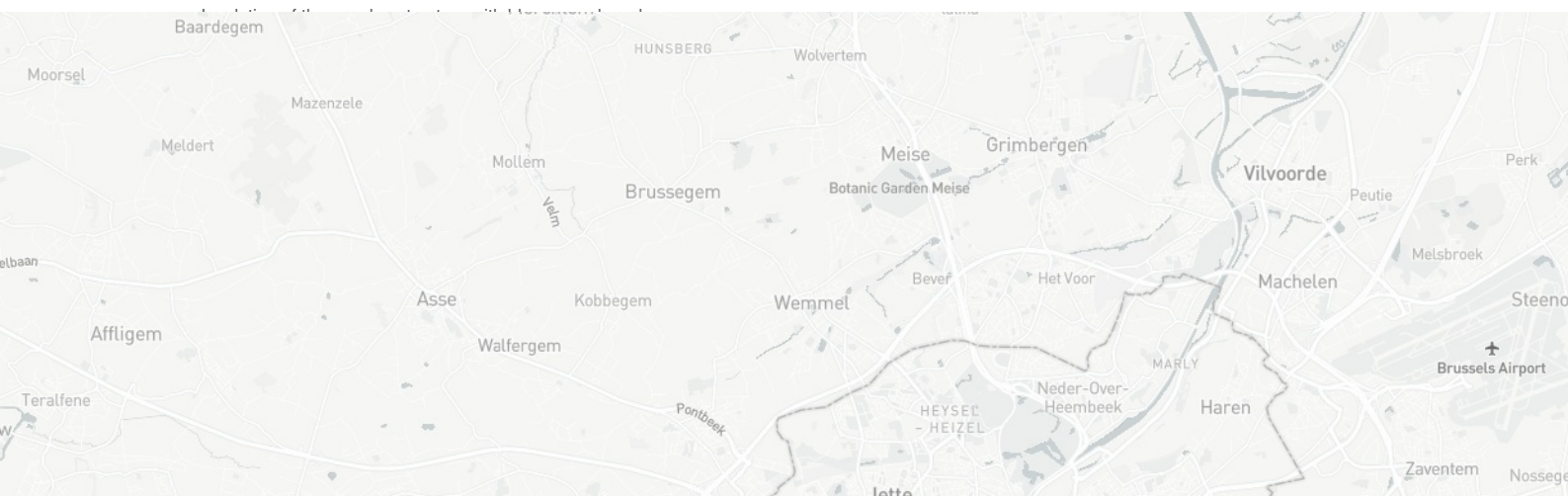
Eco-design :

The following objectives were applied and achieved:

- Optimized preservation of the building
- Building densification
- Raising in wooden structure
- Use of natural and/or biosourced insulation materials
- Use of recycled materials in/off site
- Implementation of PEFC wooden frames
- Resource conservation

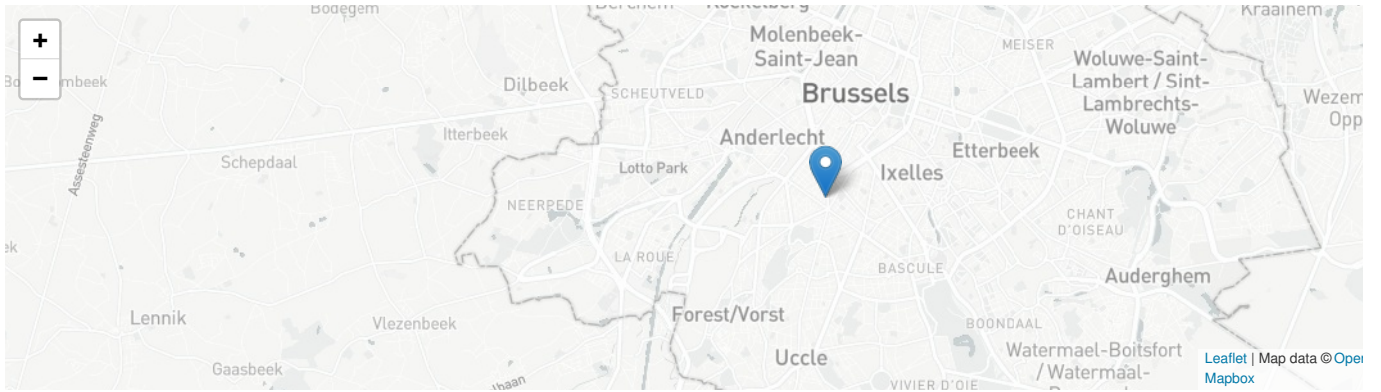
See pdf Eco-design

Sustainable supply :



Reasons for participating in the competition(s)

The Dethy project was awarded the BEcircular trophy in Brussels. It is also developing a concurrent strategy with other areas: biosourced materials, eco-design and use of digital tools (Drone, scan, BIM, IFC); to achieve an optimum result in terms of sustainable and virtuous renovation.



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