

Kantoor2023: a sustainable and circular building in Brussels

Government of Flanders (Belgium)

Background

Flanders is situated in the northern federated state of Belgium, and has a population of approximately 6.5 million people.

The Government of Flanders has been working on sustainable public procurement (SPP) since 2008. Since 2015, SPP has become a part of Flanders' overall strategy on procurement (Flemish Plan on Procurement) urging procurers to evaluate opportunities for sustainability in every contract.

Furthermore, Flanders is also highly committed to sustainability as provided in its [Energy and Climate Plan](#), which puts forward the goal of reducing greenhouse gas emissions in Flanders by 35% by 2030 (compared to 2005 levels). In this context, the implementation of the Kantoor2023 building (which translates to Office 2023) construction project will make a significant contribution to achieving such targets.

Procurement objectives

In 2017, the Agency for Facility Operations from the Government of Flanders (that is, the contracting authority) launched a Competitive Procedure with Negotiation for the procurement of the design and construction of the building. The resulting project is a renovation – of the two towers of the World Trade Centre (WTC) – with a new block annexed between the towers. The first phase of the works, cleaning and asbestos removal began in the first quarter of 2019, with phase two starting mid-2020 after obtaining the necessary permits. The works will run until mid-2023.

The sustainability aspects of the facility and the requirements set in the procurement procedure were set and measured through the sustainability tool [GRO](#)¹ from the Government of Flanders, used for all construction projects, regardless of scale. The idea behind GRO is to use an integrated design process to achieve future oriented, comfortable buildings with a strong focus on circular construction. GRO was used to set the mandatory requirements of the tender (technical specifications), whilst the award criteria concentrated more on the circularity aspects of the works.



¹ GRO is Flemish instrument used by the government to measure the sustainability of construction projects. GRO is intended to be used as an integrated design process to achieve future-oriented and comfortable buildings, with a strong focus on circular construction. It can be used for all construction functions: office buildings, tourist infrastructure, residential buildings, mixed functions, etc., regardless of the size of a construction project.

Criteria used

Subject matter of the contract:

The assignment for 'Office 2023' consisted of the design, construction and making available (via a lease) of a 'building' for the Flemish Government in Brussels; and the realisation of the furnishing works.

Building surface requirements: The Building must provide space for approximately 3,900 civil servants, furnished according to the principles of [The New Way of Working](#). This translates into approximately 2,600 workplaces or a gross surface area of at least 67,000 m².

A 12-page description of the Vision of the Government of Flanders was published which included:

- A definition for a Circular Building based on three key principles: circular material use, circular design and securing future circularity
- Ambition translated into detailed concrete principles which were structured on the basis of the different interests: people, planet, profit.

People - the principles centred on: spatial and social added value; architectural quality; location, accessibility and sustainable mobility; integrally accessible and gender-neutral; inviting and smart building; a new working environment; anchor points; collaborate; meet each other; healthy and comfortable building.

Planet – the principles centred on: healthy and safe materials; maximum and efficient use of renewable energy; raw materials cycle; efficient use of water.

Profit – the principles centred on: design and build circular which is change-oriented; cost efficient installations and operation; efficient and effective services; integrating new circular business models; financial transparency and total cost of ownership.

"The project was triggered by the need/desire to centralise several government agencies to be more efficient in different areas: energy, facilities, exploitation, etc. These agencies will move from three or four buildings to one central place: Kantoor 2023. Calculations were made of the energy impacts of the move using the [ISO 50001](#) energy management systems."

Technical specifications:

Two instruments were used to define and measure the mandatory sustainability requirements of the building. These were [GRO](#) and the [TOTEM](#) (Tool to Optimise the Total Environmental impact of Materials) tool (used in Belgium). The latter helps to evaluate the environmental impact of materials for the building design. The tool is based on the methodology of the life cycle assessment in accordance with ISO 14040 and ISO 14044. This life cycle assessment considers the impact of materials from cradle-to-grave, from reclamation to demolition.

In terms of the GRO tool – this tool has three levels of ambition regarding sustainability. The middle level was the ambition set by Flanders for this project. The following are some of the aspects which were addressed through the GRO tool as mandatory requirements:

- Waste prevention: Reuse of materials and rational use of materials. An inventory of all materials in the existing buildings was required with bidders having to indicate which elements of materials they plan to re-use, recycle (on or off-site) and which of those go to waste disposal.
- Choice of materials: 100% wood from sustainable forest management.
- Good indoor air quality.
- Accessibility: The Tenderer guarantees that the building achieves the [A++ label for accessibility](#).
- Energy: The Tenderer will seek innovative solutions to minimise energy consumption in all areas and maximise renewable energy generation systems, with the aim of approaching energy neutrality. This therefore goes further than an 'almost energy neutral building'.

- Materials passport: Drawing up a materials passport in combination with or integrated into the Building Information Modelling (BIM) model, was a requirement of the tender. The materials passport must be used during the design process, be kept up to date (during operation, maintenance, etc.) and include the delivery and commissioning of the building.
- Minimum harmful substances (volatile organic substances – VOCs).
- Separability and disassembly: Design for disassembly.

Material performance through the use of the TOTEM tool. This was used by the design team to assess the impact of material choices on the environment. Use of this tool enables the design team and the client to compare and assess the environmental impact of entire buildings. Data is required to be collected for several high environmental impact categories (various floors and walls of the building) with the aim of providing an environmental profile calculation of the building based on the different material choices.

Award criteria:

The offers were judged on the following criteria, with the percentages of total points provided also per criterion:

1) **Quality** - divided into three sub-criteria (45%)

a) **Spatial and social added value, architectural quality and functionality (20%)**

b) **Circular use of materials, energy neutral and maintenance (20%)** – with the following aspects assessed:

- Certified materials with a sustainability mark ([Cradle-to-Cradle C2C](#), [Nordic Swan](#), [EMICODE](#) or equivalent);
- Harmful substances, volatile organic compounds (VOCs), health of the materials: Stricter (possibly international) standards are met in the choice of finishing materials with (very) low emission (lower than legally required) of VOCs and as this applies to more materials, a higher score will be awarded.
- Separability and disassembly of products and components: The more ways in which the Tenderer demonstrates that future disassembly via demountable solutions has been/will be taken into account and that the choice of fastenings is also geared to this, the higher the score will be.
- Possible applications after disassembly/removal, second life cycle: Convincing explanation required from the Tender for ways in which materials can be used for their next life cycle.
- In addition, the following aspects should be taken into account when choosing the materials for buildings:
- Closing cycles: The use of materials that (as much as possible) consist of recycled material or raw materials of renewable origin and the use of material that is (as much as possible) recyclable or compostable.
- Substantiated origin of materials: The use of products and elements for which there are contractual agreements with the relevant producers and suppliers (ownership, maintenance, take-back guarantees). Depending on the extent to which the Tenderer has added this information, a higher score will be awarded.
- Energy neutral: Performance level 'better' requires a Net Energy Consumption (NEV), Primary Energy Consumption (PEV) or U-values that is/are 20% stricter than the legislation, 'PEV legal'. Performance level 'excellent' additionally requires a tightening of 10% on the 'PEV better'. The more the Building achieves energy neutrality from 'PEV excellent', the more points awarded.

c) **Plan of approach (5%)** – project management, planning and organisation.

2) **Total cost (50%)**

3) **Location (5%)**

“Circular thinking is not only based on recycling and certification. It is also conceived in a forward-looking manner. The buildings are designed in a way to enable functions to be switched for residential or non-residential use.”

Results and environmental impacts

Results of the tendering procedure

The procurement procedure began in June 2018 and the contract was awarded in spring 2019.

Due to the extraordinarily large scale of the project, three offers were received. The ambitious requirements regarding both sustainability and circularity did not have any negative impacts on the tendering process or on the number of tenders received.

The resulting building

From 2023 onwards, 3,900 civil servants will work in Kantoor2023 – a residential-work complex which is currently seeing the transformation of the two iconic WTC towers (developed in the 1970s) in the heart of Brussels' North district. The complex will be a circular building and should serve as an example for future public construction projects. The coordination of the project is done by the Agency for Facility Operations from the Government of Flanders. Rather than simply re-using the existing buildings, the design adds a new dimension by connecting the existing towers with a new 14-storey central beam creating 14 extraordinarily spacious office floors. For example, each office floor will have a workspace of more than 4,000 m² with a panoramic view. The site will cover approximately 110,000 m², split according to the following: 75,000 m² for offices, 14,000 m² for residential accommodation, 16,000 m² of hotel accommodation, and furthermore sports areas, leisure areas, catering and retail businesses. double-height volume.

The project was triggered by the need/desire to centralise several government agencies to be more efficient in different areas: energy, facilities, exploitation, etc. These agencies will move from three or four buildings to one central place: Kantoor 2023. Calculations were made of the energy impacts of the move using the [ISO 50001](#) energy management systems.

Adaptable construction

In terms of circularity, the existing buildings are being used to the maximum. The underground floors and the circulation cores will be preserved, but what will be demolished will be given a new lease of life. In total, this means that 62% of the current building will be reused or recycled. The parts that are broken down are given a new life – for instance, 30,000 tonnes of the broken concrete is going to be used as recycled granulates in the new concrete, and will be [C2C certified](#). Up to 95% of the new materials are C2C Certified.

Circular thinking is not only based on recycling and certification. It is also conceived in a forward-looking manner. The buildings are designed in a way to enable functions to be switched for residential or non-residential use. In the beginning the towers are going to be used alternately per story for office and residential functions. The facade, HVAC, lifts, fire-safety, etc. are designed so that they can serve various scenarios of usage. The neutral structure also ensures that offices, homes and hotel rooms can be furnished within the same basic structure. The building is therefore not only focused on today's needs, but can also be adapted to tomorrow's needs.

Sustainable design

User comfort and sustainability go hand in hand. An intelligent facade guarantees comfort in an energy-efficient way. Solar panels on the outside provide energy and protection from the sun. The opening windows provide fresh air during the day and natural cooling at night.

The roofs of the building and the conservatory are equipped with solar panels to the maximum. Heat and cold are extracted from the ground with a cold-heat storage system, which covers more than 60% of the energy demand. An exchange of energy between the functions will further reduce energy consumption.

In terms of biodiversity and green spaces, the structures include 2,400m² of rooftop gardens, 2,850m² of 'air purifying' facades, green office floors with 400 trees and 1,000 local plants, a greenhouse with 1,000m² of unpaved surface and

25 large trees. A number of in-house experts (working in the environmental organisations of the Government of Flanders) provided expert input into the design phase.

According to the GRO sustainability metre, the building achieves an 'excellent' result and the **E-value (E15)** will be the lowest of all buildings of the Flemish government, partly due to a cold-heat storage system in which heat and cold are extracted from the ground and through extensive application of solar panels on the roof and side walls.

Lessons learned

Circular construction is all about working together. Attitude is key. Different partners in the construction chain need each other. They must therefore all think in the same direction and strive for the same goal.

Trust is a major concern in the building and construction sector and this needs to be enhanced, both on the side of the contracting body and the contractors involved. This is particularly important when working on public procurement procedures, which are inherently not so flexible (being bound by tender documents).

Being able to evaluate circularity and sustainability in a qualitative way is very important. It should be integrated in the holistic design of a project and not looked at as stand-alone criteria. There are many interdependencies among criteria where these impact on each other in different ways. It is important to be able to see just how these can have an impact on future scenarios.

Contact person:

Almut Fuhr, Facilities Company, Government of Flanders, almut.fuhr@vlaanderen.be

More information about Kantoor2023:

[Time lapse video](#), website [article](#) (in Dutch)

Related information:

The EU GPP criteria for buildings are currently under revision – you can follow the process [here](#). Guidance on the EU Level(s) framework is available [here](#).

Links to the 2016 European [GPP criteria for Office Building Design, Construction and Management](#) and the [Technical Background Report](#) and [Procurement practice guidance document](#) are available online.