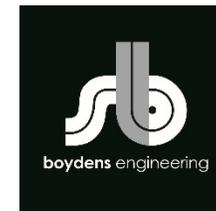


# Provincial Government Administrative Office of Antwerp



HEAT PUMP CITY OF THE YEAR AWARD 2018

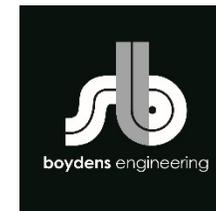
## Short description of the project



- The new Provincial Government Office with a floor surface of 26.000 m<sup>2</sup> is being built at Koningin Elisabethlei 22 in Antwerp.
- The building contains open offices, individual offices, one auditorium for 350 occupants and one for 100 occupants, an industrial kitchen, a restaurant for 200 guests, a fitness room, a data center, a library and an underground parking garage.
- Thanks to the collaboration of the different companies involved in the pre-design phase it was possible to combine the challenging architecture with extensive sustainability elements without compromising on aesthetics. As a result, the building will be passive certified, signifying that the buildings net demand for heating and cooling has been minimized to a bare minimum by minimizing the building's shape, orientation, facades, etc. A result of creative and innovative design are for example the remarkable triangular windows, that aim to optimize daylight performance with minimal heat loss and solar loads.

The government of the Antwerp province is dedicated to create an exemplary project that in a costoptimal way combines architecture, office productivity, energy efficiency, renewable energy concepts, indoor environmental quality and environmental impact.

The fluid circulating in the thermal energy storage boreholes is pure water, without glycol, to avoid any environmental risk.



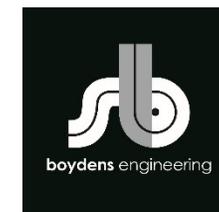
Technical details – (you can use 2 slides for this part)

- The base energetic concept of the building is the so called GEOTABS (GEOthermally supplied Thermally Activated Building Systems). A total of 350 geothermal boreholes will be installed below the underground parking, which will provide the building of the thermal energy supply. During the winter, heat pumps extract the heat from the ground, and in this way store the cold that will be applied for passive cooling during the summer. The system distributing the heating and cooling through the building, exists primarily out of concrete core activation completed with a few zones of floor heating. These low-temperature systems render an ideal efficiency of the heat pumps and passive cooling.

Hygienic ventilation is demand-driven according to the buildings air quality in the different zones. Even the heat from the industrial kitchen extractor hoods is recovered thanks to a degreasing process with UV lights.

The AHU's are equipped with indirect evaporative cooling using the rainwater storage, thus balancing the cooling emission and control between concrete core activation and air supplied cooling, or the connected supply technologies geothermal passive cooling and evaporative cooling. In long hot summers AHU integrated hybrid heat pumps can provide a third level of supply.

The office light fixtures utilizes high-performance LED appliances that can be individually programmed for more flexibility. The daylight control system will reduce the consumption further by using light fixtures that dim by responding to the daylight luminance values (light intensity values) and occupancy (presence detectors) in any given space.



Technical details – (you can use 2 slides for this part)



The roof is optimally covered with PV panels for the production of green power.

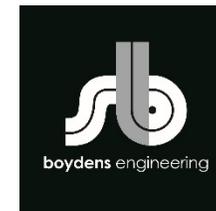
The building is a nZEB building according to the Flemish definition, and with the activated inertia of the building (through concrete core activation) will be able to play an important role in balancing the electricity supply grid when the smart grid concept will be applied in the city of Antwerp in the future.

A concept that combines several renewables, storage, energy efficiency and smart control, minimizing the OPEX, optimizing TCO (total cost of ownership).

As mentioned above the ground coupled heat pump (GCHP) provides the main thermal supply to the building. A concept that combines several renewables, storage, energy efficiency and smart control, minimizing the OPEX, optimizing TCO (total cost of ownership).

A target COP in heating mode of 5,5 and 25 in passive cooling mode will be achievable. The performances will be monitored in an extensive commissioning procedure.

Peak cooling loads will be met by the AHU integrated heat pumps, in a hybrid operation mode with the evaporative cooling, since this latter green technology is no longer capable of meeting the demand in extreme conditions.



# Multiplication potential



- The integrated GEOTABS concept can be applied in any building that has a balanced and optimized cooling and heating demand. Especially the grid balancing potential is forwarding this technology through implementation of smart connected control systems. In the future even applying MPC (model predictive control) that will take into account weather forecast, grid load forecast and the building's state of charge, predicted loads and the flexibility of the whole system.

The innovation in this state-of-the-art concept is mainly the optimization of design and operation to maximize it's potential cost and energy savings.

The new Antwerp Province Building is one of the first large scale governmental buildings in Belgium that will share explicitly operation data in order to be a well and openly documented inspiring example towards future large scale projects.

Already the newly planned GEOTABS office building for the Flemish administration in Brussels (50.740 m<sup>2</sup>) is being designed and approved.

It becomes clear that in the energy horizon a mix of buildings with a hybrid operation of several renewable technologies, a robustness in indoor quality and a flexible and shiftable load towards the grids is appearing.

And in this mix, the GCHP is claiming it's role as a stable weather-independent team-player.

