Energy

What choices we made for the benefit of saving energy? The technical choices for installation systems and the structural components that impact on energy saving. Even the choice of the elevator installation affects energy savings.

BREEAM rating and score

Design certificate	=	★★★★★
Completion certificate	=	★★★★★
Guideline applied	=	BRL 2011 v. 1.0
Score	=	91.22 %

This percentage is subject to the innovation credit award.
The award is currently being evaluated by the DGBC.

Start of design phase	=	November 2013
Start of the building preparation	=	January 2014
Start of construction	=	1 March 2014
Commissioning date	=	Phased commissioning from October 2014

Key figures

Floor area warehouses	=	GFA 49,027 m²	VVO 48,095 m²
Floor area offices	=	GFA 717 m²	VVO 659 m²
Site area	=	72,560 m²	

The approach to make the distribution centre as sustainable as possible.

The entire approach towards making the NewLogic II Distribution Centre as sustainable as possible was viewed from an absolute Trias Energetica perspective. On the basis of this philosophy, we initially consider the potential for maximizing savings on the energy requirement. Secondly, we consider the generation of energy and thirdly, the efficient use of fossil energy.

The basis of step 1 involves looking for solutions in the building envelope. The less heat that "leaks" from the building, the less energy is required to heat or cool the building. The building envelope criteria for an industrial function, whereby the accommodation of people is secondary, are not very stringent in regulations* in the Netherlands. In fact: the regulations do not include any criteria for making an EPC calculation for the industrial function. Very few people are employed in a building with an industrial function; the people who do work there do not have a high temperature requirement (15 degrees is generally sufficient); goods are primarily stored, which only require frost-free storage.
We opted to create an insulation shell with a surrounding Rc value of 5.0 m²K/W for this distribution centre.

The temperature requirement for the office areas differs to the industrial function. Our choice for a high-quality insulation shell for the entire building meant that we did not need any thermal barrier between the office and industrial function.
For the climate control system in the office areas we chose a sustainable energy system. A VAV system was fitted in the office, which blows in more air when an area is occupied by more people or when the room temperature rises. Furthermore, the system was designed such that outdoor air can be blown in directly, when the outdoor temperature is suitable for this. This means that at these times less energy is required for heating or cooling the air.

In addition to the choice for a high Rc-value in the closed façade sections, due consideration was also given to thermal insulation when selecting the window frames. An aluminium frame profile fitted with triple glass glazing was selected here. The window frames have a U value of 1.0 and the glazing has a U value of 0.7.

Building site and building process

The building was constructed by main contractor Heembouw. Heembouw achieved the ISO 14001 certificate in 2013.

The new-build distribution centre NewLogicII is the 2nd BREAM route for Heembouw. The experiences from the previous project created new objectives in order to reduce CO2 consumption during construction. In particular, attention was paid to waste separation, specifically wooden pallet waste. All building partners were encouraged to delivery their products on deposit pallets and to return them.

All taps in the changing room/rest room on the building site are fitted with automatic volume limiters so that water use is purely essential and that taps cannot be left on by accident. The portacabins are fully fitted with LED lighting, which is the most energy efficient form of lighting. In addition, a MAN 3 Eco portacabin was selected for the building site reception.

The energy consumption and water is was monitored weekly, in view of the fact that the speed of construction is extremely fast. We achieved the following results for this project:

- Energy use during construction = 1,310 kWh
- Water use during construction = 1,734 m³
  of which 800 m³ is used to fill the pond eco portacabin

Energy use building

The ambition of the client is: a building that is as sustainable as possible, within what is realistically feasible.

The highest cost in a distribution centre in terms of use is primarily the lighting. In order to reduce this energy use as much as possible we have taken 2 measures. The first is a structural solution. By using translucent façade panels in strips in the façade that correspond with the gangways between the shelves. In this way we are able to ensure that more daylight enters the building, so that the lighting can even be turned off on light/sunny days. In view of the security of a distribution centre it is not desirable to use transparent (clear) glazing.

In addition, the artificial light is completely LED, which is the most energy efficient at this time.

For the office we continued searching for an optimal heating and cooling installation.

The offices are fitted with a HAC system (heating and cooling). The production hall is fitted with heating only. This is done by means of radiant panels. No cooling will be fitted in the production hall.

In order to be able to save as much as possible on heating and cooling, a high Rc value was opted for in walls, floors and roof:

- all closed façade elements = Rc value = 5.0 m²K/W
- entire roof = Rc-value = 5.0 m²K/W
- window frames = Rc value = 1.0 W/m²K
- glazing = Rc value = 0.7 W/m²K

In addition to the translucent façade cladding in the production halls, the offices are also fitted with as much daylight as possible. Beside the floor at the level of the office functions a continuous window frame strip has been designed, with a minimum parapet of approx. 40cm. Ceiling-high glass was designed afterwards.

Expected energy use in kWh/m² GFA	= 15 Wh/m² GFA/yr
Expected use fossil fuels in kWh/m² GFA	= 2.5 m³/m² GFA/yr
Expected use of sustainable energy sources in kWh/m² GFA	= 0.28 kWh/m² GFA/yr
Expected water use in m²/person/year	= 7.6 m³/person/yr.
	(based on 200-260 working days a year)

Expected % of water use that is included via rainwater discharge or grey water = 11.8%

Flexible construction

The building was designed according to the following construction principle: steel construction combined with precast unit floors. By opting for this principle, the building has a high degree of flexibility. This flexibility is only assured when consideration is also given in this way to the design of the installations.
In order to be able to make full use of the flexibility of the building, the decision was taken to add the installations to the bearing construction completely independently.
Several basic ducts have been created at strategic locations in the building. (In general, this means a shaft in the vicinity of the lift and near the wet groups).
All installation components for the office are fitted between the structural ceiling and the suspended ceiling. The installations hang loose, above the suspended ceiling, on the steel structure or on the floor. In this way the installation can easily be modified and the layout can also easily be modified and extended. The design of the façades is also conceived to easily change functions, or extend the office m².
The fire concept has also been conceived on this basis. By using a sprinkler system, changes can be made more flexibly. However, the user/lessee does need to remember that the sprinkler document should be amended for large changes in function.

FSC wood

All the wood used in the building has the FSC label. In view of the fact that Heembouw is also FSC certified, the wood that is used during construction (and not definitely attached to the building) is FSC wood.
The building design includes wooden façade cladding. This façade cladding is made from thermal sustainable ash. The ceiling at the entrance is fitted with this type of wood.

Charging station electric cars

The personal parking spaces include 10 charging stations for electric cars. These charging stations are fully fed by sustainably generated energy. The charging stations are available for both the personnel and visitors. The PV panels on the roof of the building provide the power supply to the charging stations.

The structure

The basic structure of the building consists of a steel skeleton with optimized dimensioning.
The size of the steel structure is fully tailored to the usage. The column positions are positioned to correspond with the shelving plan. The least possible columns are visible in the halls. Where the columns are visible and may be driven into, they are fitted with column shields, so that the structure is damaged less and is more durable.

The ground floor is a poured concrete floor, which is directly poured on rubble granulate.
The rubble granulate serves as a foundation. We call this a floor on steel. The bearing load for the floor is partly taken from the rubble granulate foundation and partly from the soil improvement used. An advantage of this is that no pile driving is necessary for the concrete floor. This makes a difference in material usage for the entire building. In addition, the rubble granulate is made from high-quality recycled material and thus better than applying an expensive and much less sustainable layer of sand.

The skin of the building

The façade of the building is compiled of Kingspan insulated wall panels with an extremely high Rc value (5,0 m²K/W). Vertical panel distribution was selected at the location of the industry hall, so that the translucent façade panels (also Kingspan) can also be mounted in this rhythm. These translucent façade panels have the same fixing principle as the insulated wall panels.
At the office façade the panels are horizontally mounted and in terms of distribution are included in the window frame size. The window frames are designed for the panel size, which means that there is virtually no waste.

The plinth of the building is fitted with a prefab concrete insulated element that is also fitted with a high Rc value (5.0 m²K/W). This plinth also serves as robust crash protection. The height of the panels is equal to the level of overhead doors, so that a neat line continues throughout the design. The insulated wall panels start above the concrete plinth.

For the airtightness of the building and particularly at the location of the offices, extra compribands are included between the offices. These connections have all been practically tested using an airtightness measurement and compared with the Qv-10 value using the EPC calculation. The result of this measurement is a Qv-10 value of 0.42. The office façade is located to the south. In the design, consideration has been given to the later placement of fixed wooden louvres on the exterior of the building for permanent sun blinds. At this time, sun blinds have only been applied on the inner side.

The roof has a traditional roof structure (appropriate to a steel structure). The basis is a steel profile plate fitted with hard press insulation and roof cladding. This also has a high insulation value, such that we can achieve an Rc = 5.0 m²K/W. The roof cladding is a light PVC roof cladding. The light colour ensures that the sunlight is initially reflected as much as possible, before the warmth of the sunlight can penetrate the building.

Water usage

The front terrain is equipped with multiple grey-water tanks, which will provide the toilets with flushing water. The toilets have a maximum flush use of 4 litres /flushing. From the usage water-free urinals are in use. Also, all men's toilet facilities are fitted with more urinals than toilets in order to further reduce water usage. Also, all spaces where water usage occurs are fitted with intermediate metering, so that water usage can be monitored well and any leaks can be quickly signalled.