Energy Academy Europe

The most sustainable educational building in the Netherlands
Harvesting energy from the four natural elements, using a minimum of technology
Sustainable, recyclable materials
The most sustainable teaching building in the Netherlands is right here in Groningen.

Jan de Jeu, Vice President of the Board of the University of Groningen

Winner BREEAM Awards 2017

On 7 March 2017, it was announced in London that the new Energy Academy Europe was the winner of the international BREEAM Awards 2017 (Mixed Use & Other’ category). Worthy recognition from a professional jury of the unique and sustainable exemplary project that has been realized in Groningen.

Proud university

‘The University of Groningen is proud to have won this prestigious BREEAM award,’ says Jan de Jeu, Vice President of the Board of the University. ‘This unique new building project serves to endorse the way in which the University has integrated the theme sustainability into its very being. We explore avenues for sustainable innovations and energy-saving opportunities not only in our building projects, but also for our policies on waste and purchasing, for example, where our use of natural resources is an important priority. This ambition and attitude is reflected in the Energy Academy Europe building.’

Green university

Initiatives like this have helped to put the University of Groningen in 15th place in the Green Metric, the list of the world’s ‘greenest’ universities.
‘The new building must be an icon for the pioneering role the North is playing in the energy transition process.’

Max van den Berg, King’s Commissioner (2007-2016)
Use of natural resources
Energy Academy Europe has low energy requirements. It requires little technology as it makes use of the elements that nature has to offer.

Earth
The insulating properties deep down in the earth are perfect for storing warm or cool water, to be tapped as and when needed. This system of geothermal energy storage makes it possible to provide heat in winter and coolness in the summer without consuming any energy. In addition, ventilation air is cooled or heated while transported through the labyrinth.

Water
Rain from the sloping roof runs into a large basin. Purified drinking water is not squandered on flushing the toilets or watering the plants in the winter garden.

Solar energy
Solar panels cleverly placed to create pyramids harvest energy on the roof. Triangular windows between them allow daylight in to save artificial light.

Air
The building is ventilated by natural drafts. A ‘solar chimney’ creates a warm spot at the top of the building, drawing fresh air in through a thermal labyrinth underneath the building.

Fire
Solar panels cleverly placed to create pyramids harvest energy on the roof. Triangular windows between them allow daylight in to save artificial light.

Want to know how the building works?
Watch the explanation on rug.nl/GroundbreakingWork/EAEvideo
Producing more energy than it uses

A BREEAM Outstanding score of 89.62% makes the Energy Academy the most sustainable teaching building in the Netherlands. It produces more energy than it uses. The building satisfies highly stringent sustainability criteria. To achieve this, a team of experts comprising Broekbakema, De Unie Architecten, ICS Adviseurs, Arup, Ingenieursbureau Wassenaar and DGMR was set up. The building now serves as an example for prospective new building projects throughout the world.

Sustainable building process

Sustainability was also a key feature of the building process. The materials used have a low impact on the environment, water and energy consumption was kept to a minimum, waste was separated for recycling and 50% of the concrete was made from recycled granulated concrete.

The photographic content of this booklet was supplied by: Gerhard Taatgen, Pepijn van den Broeke, Egbert de Boer, Ronald Zijlstra and Jeroen de Lezenne Coulander. The accompanying video ‘How does the building work?’ was produced by Strawberry Fields and can be viewed here: rug.nl/GroundbreakingWork/EAEvideo
Built in just 18 months

The University of Groningen entrusted the construction of Energy Academy Europe to the Friso building consortium from Sneek and Koopmans Bouwgroep from Enschede. ENGIE technical installations was responsible for installing the technology in the building.

The building was completed in October 2016, just 18 months after building work started. The public were invited to come and look around the building site on Building Day, which was held on 4 June 2016.
Vibration-free pile-driving
The piles supporting Energy Academy Europe were not driven into the ground: a special method ensured that people using buildings nearby were not bothered by the usual noise and vibrations caused during pile-driving. The first step was to drill deep holes into the sandy earth. They were then reinforced and filled with concrete. Once the concrete had hardened, the resulting piles were dug out and used for the foundations of the building.
Earthquake-proof building process
Energy Academy Europe is one of the first buildings in Groningen to be designed to withstand earthquakes. If an earthquake occurs, six seismic walls absorb the energy generated by the earthquake. The building will sway flexibly around these solid, seismic cores.

Other special features that make the building earthquake-proof are: extra hard, laminated glass, walkways in the atrium to connect sections of the building and a roof that moves if the building shakes.

Unique type of earthquakes in Groningen
The earthquakes in Groningen are caused by drilling for gas. The effect of these earthquakes is different from that of tectonic earthquakes, which occur as a result of natural fault lines in the Earth’s crust, as in Japan for example. ‘Groningen-quakes’ are usually short and sharp, with a vertical acceleration (compression wave) followed by a horizontal acceleration (shift wave). They can cause more damage than natural earthquakes of a similar strength. The Scale of Richter does not apply to these earthquakes as it is the effect of the Peak Ground Acceleration that counts.
Connections and contact
The building comprises two sections, joined by the atrium, the beating heart of the building where the two worlds meet. The research area with laboratories and related workshops have been built on the north side, while the south side houses workspaces, a winter garden and teaching rooms.

Take the stairs
The floors have been finished with natural materials and link all the separate sections of the building. Attractive, wide, sloping ramps tempt users and visitors into taking the stairs instead of using the lift almost without noticing; a smart way to encourage exercise and personal contact, while saving energy by discouraging use of the lift.
Green ventilation
A black ‘solar chimney’ has been mounted at the highest point on the north side of the building. During the day, the black surface of the chimney is heated by the sun, warming the air inside. This creates an upward air flow inside the building, and draws in cool air. In this way, solar heat (aided by the wind) provides ventilation. The ‘stale’ air also leaves the building through the solar chimney.
Natural draft
Fresh air is essential to a pleasant indoor climate. The building has a hybrid ventilation system, which makes optimum use of natural ventilation. Sun and wind are used to create a natural draft. The warmest zone in the top of the building draws fresh air from outside into the labyrinth at the bottom. The air is spread through the building via huge air vents, corridors and the atrium. If the weather conditions are not conducive to the system, mechanical ventilation will kick in automatically.

Using the terrestrial temperature
The basement houses a labyrinth that collects and stores daytime heat and night-time coolness, and gradually dispenses thermal energy to heat or cool the building as required. The air in this 200-metre air vent flows slowly, at less than one metre per second. The winter garden serves as an important buffer zone, where air can be acclimatized.
Landscape of 133 triangles

Energy Academy Europe makes optimum use of sunlight for lighting and for generating energy. The south-facing sloping roof could have been completely covered by 1,600 One Solar panels. But thanks to this smart landscape of 133 triangles, a staggering 37% more energy is being generated. But that’s not all; they also leave room for skylights, which provide natural daylight. As a result, the low-energy LED lighting is not always needed.
The Energy Academy is located on the Zernike Campus Groningen, the hub of knowledge and entrepreneurship in the north of the city of Groningen. More than 4,000 researchers and staff, and several hundred entrepreneurs are working here to develop the innovative solutions we need for the future. Every day, over 35,000 students are being trained to become professionals at the University of Groningen and Hanze UAS Groningen. The high-tech facilities and opportunities for collaboration form an excellent breeding ground for the products and services of the 150 companies based here.

The combination of knowledge, education and entrepreneurship makes Zernike Campus Groningen a dynamic breeding ground for new ideas, applications and products.

EnTranCe (Energy Transition Centre) is affiliated to Energy Academy Europe. This applied energy research test bed belonging to Hanze UAS Groningen is also based on the Zernike Campus Groningen.
The building work attracted a lot of interest.
Heat pump, sustainable cooling medium

A heat pump is part of the geothermal energy storage system. The Energy Academy Europe is the first Dutch building to be fitted with a heat pump (Carrier Aquaforce 30XW) with the new, environmentally sound and ozone-neutral coolant HFO-R1234ze(E). This substance is fully degradable in 18 days, whereas standard coolants take 14 years to degrade. The burden on the climate (the GWP or Global Warming Potential) is less than 1, which is way below the current norms. In addition, in terms of energy, the heat pump performs slightly better than heat pumps using standard coolants.

Under-floor heating and cooling

In addition to air-powered heating and cooling, Energy Academy Europe also uses concrete core activation. Long pipes laid in the constructive mass of the floors emit heat or cold into the floor, ensuring a constant indoor temperature. The water running through the pipes comes from tanks buried deep underground, which store cold water in the winter and warm water in the summer. This is known as geothermal energy storage.
Larch wood fins
Energy Academy Europe has unique outer cladding, which helps to create an optimum indoor climate. The cladding keeps heat and coolness inside, while repelling sunlight when necessary. The façades are covered in fins made from FSC-certified larch wood. These wooden fins create gentle shade, dispensing with the need for extra sun blinds.

Winter garden: buffer zone and meeting place
The large winter garden serves as a public park, a place to meet during breaks and a workplace for users. The floor-to-ceiling glass and luscious plants make the winter garden an important buffer and heating zone for the natural ventilation, and a place where fresh air can enter the building from outdoors. Visitors can sit back and enjoy the green setting.

Unique cladding for optimum insulation and daylight
This project is co-financed by the Northern Netherlands Provinces alliance (SNN), the Ruimtelijk Economisch Programma and the Ministry of Economic Affairs.

Contact

Energy Academy Europe
Nijenborgh 6
9747 AG Groningen
050 363 8888