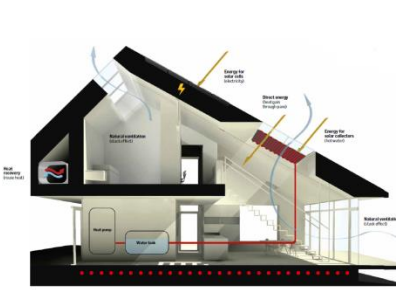
DK_Lystrup_Home for Life

Image 01: South-east view © Michael Franke/Guardian News & Media Ltd 2010	**Image 02:** Roof with automated windows © Martin, Dyrløv Madsen	**Image 03:** Cross section © Velux
		

Building Specifications

Address	Elmehaven 1B, 8520 Lystrup, Denmark
Building Category	Residential
Year of Construction	2009
Special Qualities	NZEB, Active House
Location	56° northern latitude, 10° eastern longitude, located in flat land. Located in suburban area in a small town. There are no buildings close to the building
Climate	Cfb (warm temperate climate, moist with adequate precipitation in all months and no dry season, warm summer with the warmest month below 22°C)

Vent. Cooling Site Design Elements (Solar Site Design and Wind Exposure Design, Evaporative Effects from Plants or Water)

n/a

Vent. Cooling Architectural Design Elements (Form, Morphology, Envelope, Construction & Material)

Form: Two storey building with a double – pitched roof with an off-centre roof ridge to make room for a large south-facing roof surface for maximum energy generation.

Morphology: The interior of the house is divided into several zones. Kitchen/common rooms on the ground floor is the core of the house from which living room, WC, facility room and the stairs to the first floor can be easily accessed. Several doors to the outside and large windows add the transparency feel and ensure a good interaction between indoors and outdoors. The total area is 190m2.

Envelope: Dark coloured natural shale is used for covering the façade and roof thereby creating an uniform appearance of the building. Well insulated walls (U value of 0.07 – 0.1 W/m^2K) and roof (U value of 0.07 W/m^2K), as well as energy efficient windows (U value of 0.7 – 1.0 W/m^2K) are used. Cold bridges are kept to a minimum. The window openings and skylights are placed strategically to enhance the performance of natural ventilation by the use of wind and stack-effect, as well as ensuring high amount daylight entering all rooms.

Construction: Light, well insulated, wooden frame construction.

Vent. Cooling Technical Components (Airflow Guiding Components, Airflow Enhancing Components, Passive Cooling Components)

Night ventilation is executed by automated window control, utilizing the stack-effect over two storeys via the open staircase. Comfort ventilation is ensured by natural ventilation with automated window control. Automated exterior sun screening is used to control the amount of light and heat entering the building through the windows.

Actuators, Sensors and Control Strategies

Chain actuators operate façade and roof windows

Room sensors for temperature, humidity, CO2 and illumination

Outdoor sensors for temperature, humidity, CO2, wind, rain and solar irradiation.

Centralized system control is used for the building indoor climate and energy usage/production control. Natural ventilation is controlled by io-homecontrol® system.

Building Energy Systems (Heating, Ventilation, Cooling, Electricity)

Solar heat pump, solar thermal collectors (6.7m2), floor heating

Hybrid ventilation with both mechanical ventilation with heat recovery and natural ventilation

PV system (50 m2), grid connected

Building Ownership and Building Facility Management Structures

The owners live in the building.

Architect: AART Architects

Aknowledgements

n/a

Datasheet Source:

The building was part of the “VELUX model home 2020” research project. Extensive monitoring been carried out