

## The Norwegian Nature Agency's official residence in Thy

by Asta Justesen / 2023-03-15 15:20:03 / International / 12 / EN



New Construction

Primary energy need :

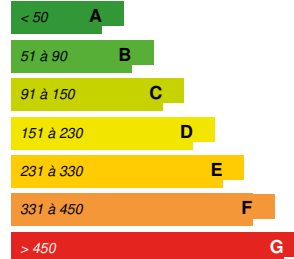
**37** kWhpe/m<sup>2</sup>.year

(Calculation method : Primary energy needs )

### ENERGY CONSUMPTION

Economical building

Building



Energy-intensive building

**Building Type** : Terraced Individual housing

**Construction Year** : 2020

**Delivery year** :

**Address 1 - street** : Kystvejen 11 7700 THISTED, Denmark

**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 153 m<sup>2</sup> Other

**Construction/refurbishment cost** : 322 444 €

**Cost/m2** : 2107.48 €/m<sup>2</sup>

**Certifications** :



### General information

#### A wood building in the forest

Near the scenic Klitmøller in Thy, is built the Nature Agency's official residence. The local forest runner lives with his family in a fine and simple wooden house, which BJERG designed in 2019.

The house blends naturally into the surroundings without disturbing either people or nature. Even after work, the forest runner can enjoy the beautiful nature, as the surroundings enter the house's living room and kitchen via the large window sections.

The house in Thy is built according to **passive house principles** and has a CO2 footprint of 5.1 kg CO2/m2/year, which is significantly better than the "voluntary sustainability requirement" of 8 kg/m2/year, which has been decided from 2023.

#### A low CO2 footprint

The house's low CO2 footprint is due to both design and choice of materials. A significant climate reduction already occurs at the start of the design process, when we orient the primary rooms with large window sections to the south. This reduces the need for artificial light and heating, and thus the house's total **energy needs are reduced**.

Wood is used as the primary material, and instead of glass wool we use wood fiber for insulation, as it can absorb and transport moisture to a greater extent. The house has a tight and well-insulated climate screen, as it reduces energy demand and CO2 emissions.

The dense building shell also provides a **healthy indoor climate** without thermal bridges.

The Danish Nature Agency is enthusiastic about the home: "In Thy, we have not only got a beautiful home. But also, a home that really improves on a CO2 account, has a healthy indoor climate and low costs for operation and maintenance. We have chosen to build in wood to emphasize the Norwegian Nature Agency's roots, and find that BJERG Architecture with a simple design has managed to make the house blend elegantly into the surroundings," Kim Røjgaard, head of finance, Norwegian Nature Agency.

## Photo credit

Mads Bjerg

## Stakeholders

### Contractor

Name : Naturstyrelsens, NST Bygningscenter

<https://naturstyrelsen.dk/>

### Construction Manager

Name : Bjerg Arkitektur A/S

<https://bjerg.nu/>

## Energy

### Energy consumption

Primary energy need : 37,00 kWhpe/m<sup>2</sup>.year

Calculation method : Primary energy needs

Breakdown for energy consumption :

**PE demand (non-renewable Primary Energy): 37 kWh /m<sup>2</sup>a**

- Air tightness: n50 = 0.22/h
- Annual heating demand: 14 kWh/(m<sup>2</sup>a) calculated according to PHPP
- Heating load: 14 W/m<sup>2</sup>
- Cooling load: 0 W/m<sup>2</sup>

**Primary Energy Renewable (PER) demand: 48 kWh/(m<sup>2</sup>a)**

### Envelope performance

More information :

- External Wall

Wooden profile 20 mm

Air 57 mm

Wind barrier 8 mm

Wood with woodfiberinsulation 295 mm

Installation layer 70 mm

Gypsum 25 mm

U-value: 0.102 W/m<sup>2</sup>K

- Roof

Plywood and roofing felt 15 mm

Lath and air 91mm

Wind barrier 8 mm

Wood with woodfiber insulation 400 mm

Plywood 15mm

Wood with insulation 100 mm  
Cement-wood ceiling 37 mm  
U-value: 0.083 W/m²K

- Floor  
Insulation EPS with graphit 400 mm  
Concrete 120 mm  
Wooden/ Vinyl floor 20mm  
U-value: 0.075 W/m²K

## Renewables & systems

### Systems

Heating system :

- Heat pump

Hot water system :

- Heat pump

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Other information on HVAC :

The Mechanical systems is one compact unit that provides ventilation, heating & domestic hot water.

## Environment

### Urban environment

The house blends naturally into the surroundings without disturbing either people or nature.

## Products

### Product

Compact P Nilan

Nilan

<https://www.nilan.dk/>

Product category : Structural work / Passive system

The Compact P is a ventilation and heating system that provides with ventilation, heat recovery and domestic hot water production. It ensures a daily renewal of the air by evacuating dust, odors and excess humidity for a healthy and pleasant indoor atmosphere. When it is hotter inside than outside the house, an integrated bypass lets fresh air in directly to cool down as much as possible without using additional energy.



## Costs

### Construction and exploitation costs

Total cost of the building : 322 444 €

## Health and comfort

## Life Cycle Analysis

LCA materials with fase D (recycling potential) - 1 kg/m2 per year.

## Water management

Rain water is running to a rain biotope, grey water is filteret on site.

## Indoor Air quality

- Cross ventilation can be used in all rooms.
- Indoor air quality in the summer: all rooms have windows to outside and opens to living area.

## Comfort

Temperature level :

- Interior temperature winter 20°C
- Interior temperature summer 25°C

Ergonomic design :

- Southfacade is 3d - if a curtain is closed - an airgap between glacing and curtain can ventilate solar gains;

## Carbon

### GHG emissions

GHG in use : 5,10 KgCO<sub>2</sub>/m<sup>2</sup>/year

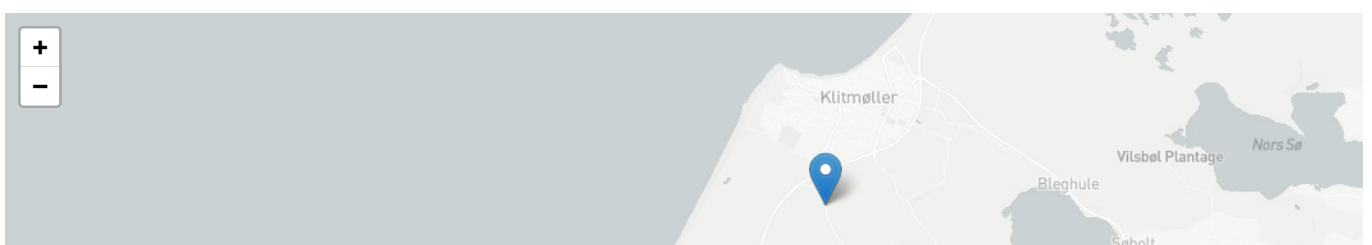
Methodology used :

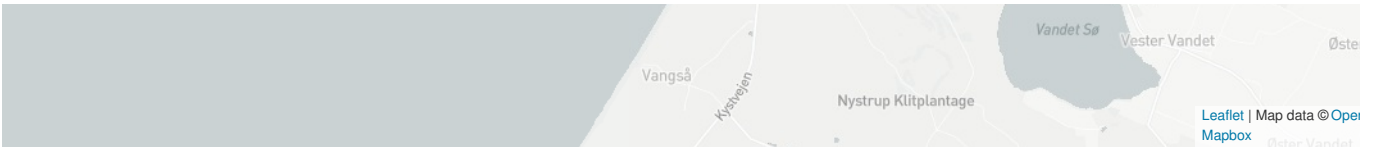
GHG emissions (GHG in use can be found in the PER sheet in the PHPP): 0 According to PER and CO<sub>2</sub>/kWh final DK2035

## Contest

### Reasons for participating in the competition(s)

- The house is built according to the passive house principles;
- It has a low carbon footprint;
- Reduced overall energy demand;
- Wood is used as the primary material;
- It has a dense and well-insulated building envelope;
- Healthy indoor climate.





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