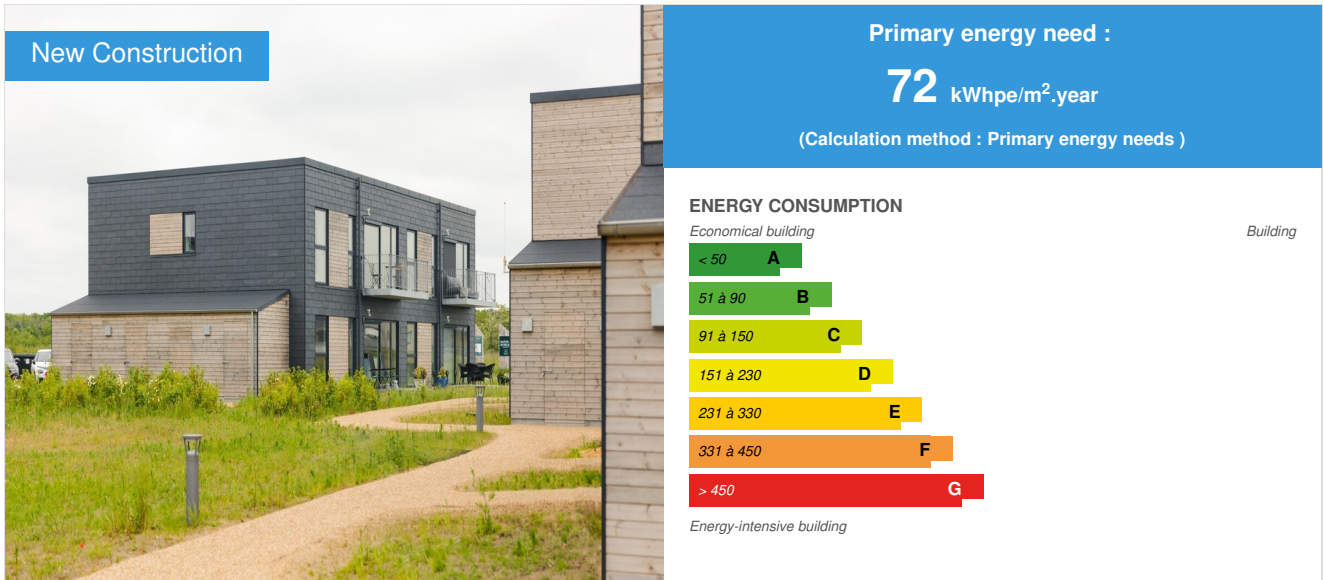


## Fjord View - energy efficient social housing

by Asta Justesen / 2023-03-02 00:00:00 / International / 103 / EN



**Building Type :** Terraced Individual housing  
**Construction Year :** 2021  
**Delivery year :** 2021  
**Address 1 - street :** Fjordudsigten 2-34 6950 RINGKØBING, Denmark  
**Climate zone :** [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area :** 7 966 m<sup>2</sup> Other  
**Construction/refurbishment cost :** 16 000 000 €  
**Cost/m<sup>2</sup> :** 2008.54 €/m<sup>2</sup>

**Certifications :**



### General information

“Fjordudsigten” is the name of these houses which means “The View of the Fjord” in Danish. It is located on the west coast of Denmark and includes 80 terraced houses.

The houses are quite unique. They are designed after the ambitious **Passive House Plus** principles, which means the houses do not need much energy to be heated. In fact, **the homes here produce more energy than they consume**. The ultra-low energy buildings provide a high level of comfort, a healthy indoor climate, cheaper heating bills as well as they are more climate friendly than conventional construction.

“The view of the Fjord” is a leading example of how public housing can be built with a **minimal CO2 footprint** without exceeding the price and without compromising on quality, longevity and well-being. LCA calculations show that **the homes have a CO2 emission of just 3.1 kg CO2e /m2 each year**. It is **75% less than the requirements of the Danish building regulations**.

By optimizing how we heat up the houses and keep it from leaking, we reduce the use of CO2 heavy resources. The majority of the energy savings are an effect of

the buildings design and construction. They have a compact building shape, quality insulation, high-efficiency mechanical systems, airtight construction and solar orientation of the high performance windows. **The current residents achieve 63% energy savings** compared to an average spending of houses of the same size in Denmark. In a time with high energy prices, these kinds of houses are super attractive.

Making nature an integrated part of the whole area was an important principle in the design process. That is why **the buildings and existing nature merge in a way that gives the residents a feeling of being part of the nature** that surrounds them. To make sure nature around the area is preserved and to climate-proof the buildings there are systems in place to transport fallen rain from the buildings to surrounding creeks and watery areas.

## Photo credit

Jonas Krebs

## Stakeholders

### Contractor

Name : Bjerg Arkitektur A/S

<https://bjerg.nu/>

### Construction Manager

Name : Bjerg Arkitektur A/S

<https://bjerg.nu/>

### Stakeholders

Function : Contractor

Erasmus & Partnere

<https://erasmus.dk/>

Mechanical Engineer

## Energy

### Energy consumption

Primary energy need : 72,00 kWhpe/m<sup>2</sup>.year

Calculation method : Primary energy needs

Breakdown for energy consumption :

#### Block E

**PE demand (non-renewable Primary Energy):** 64 kWh /m<sup>2</sup>a on heating installation, domestic hot water, household electricity and auxiliary electricity calculated according to PHPP:

- Air tightness: n50 = 0.6/h
- Annual heating demand: 4 kWh/(m<sup>2</sup>a)
- Heating load: 8 W/m<sup>2</sup>
- Cooling load: 0 W/m<sup>2</sup>

#### Primary Energy Renewable (PER):

- Demand: 30 kWh/(m<sup>2</sup>a)
- Supply: 127 kWh/(m<sup>2</sup>a)

#### Block D

**PE demand (non-renewable Primary Energy):** 80 kWh /m<sup>2</sup>a on heating installation, domestic hot water, household electricity and auxiliary electricity calculated according to PHPP:

- Air tightness: n50 = 0.6/h
- Annual heating demand: 7 kWh /m<sup>2</sup>a
- Heating load: 10 W/m<sup>2</sup>
- Cooling load: 0 W/m<sup>2</sup>

#### Primary Energy Renewable (PER):

- Demand: 38 kWh/(m<sup>2</sup>a)

- Supply: 71 kWh/(m<sup>2</sup>a)

## Envelope performance

### More information :

#### - External Wall:

Wooden profile 20 mm  
Air 25 mm  
Wind barrier 8 mm  
Wood with insulation 295 mm  
Installation layer 95 mm  
Gypsum 25 mm  
U-value: 0.095 W/m<sup>2</sup>K

#### - Roof:

Plywood and roofing felt 15 mm  
Lath and air 50 mm  
Wood with insulation 510 mm  
Fiber gypsum 16 mm  
Wood with insulation 45 mm  
Cement-wood ceiling 25 mm  
U-value: 0.072 W/m<sup>2</sup>K

#### - Floor:

Insulation EPS with graphit 400 mm  
Concrete 120 mm  
Wooden/ Vinyl floor  
U-value: 0.075 W/m<sup>2</sup>K

## Renewables & systems

### Systems

#### Heating system :

- Heat pump

#### Hot water system :

- Heat pump

#### Cooling system :

- No cooling system

#### Ventilation system :

- Double flow heat exchanger

#### Renewable systems :

- Solar photovoltaic

## Environment

### Biodiversity approach

The apartments are 80 to 115 m<sup>2</sup>, in one or two floors with their own balcony or terrace. Nature's large communal garden right outside the door and a view of Ringkøbing Fjord.

All homes in Fjordudsigten have direct access to flowering meadows and the many other natural experiences already created in the Nature District: berry orchards, fruit groves, lakes, a new forest, a stream and paths connecting the new district with Ringkøbing's historic city centre.

### Urban environment

The houses are located in Naturbydelen, a unique residential district on the West Coast of Denmark. It offers attractive residences in the middle of a beautiful natural area, close to the medieval town centre of Ringkøbing. The city's many shops, schools and cultural attractions are within 4-5 kilometres and can be reached quickly by bike or car.

The former agricultural area has been transformed into a recreation area with woods, lakes, meadows, an orchard, berry orchards, roads, paths and places for

activities were established before the first houses were built, which in addition enjoy a panoramic view of the Ringkøbing Fjord.

## Products

### Product

Ventillation Compact P Nilan

Nilan

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

Product category : HVAC, électricité / ventilation, cooling

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

## Health and comfort

### Life Cycle Analysis

LCA - 2,5 kg/m2 per year. LCA incl. PV - 3,1 kg/m2 per year.

### Water management

Rain water is running to a rain biotope and from here to a brook, grey water runs to a central cleaning plant.

### Indoor Air quality

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

## Carbon

### General infos

CO2 emission is 75% less than the requirements of the Danish building regulations.

### GHG emissions

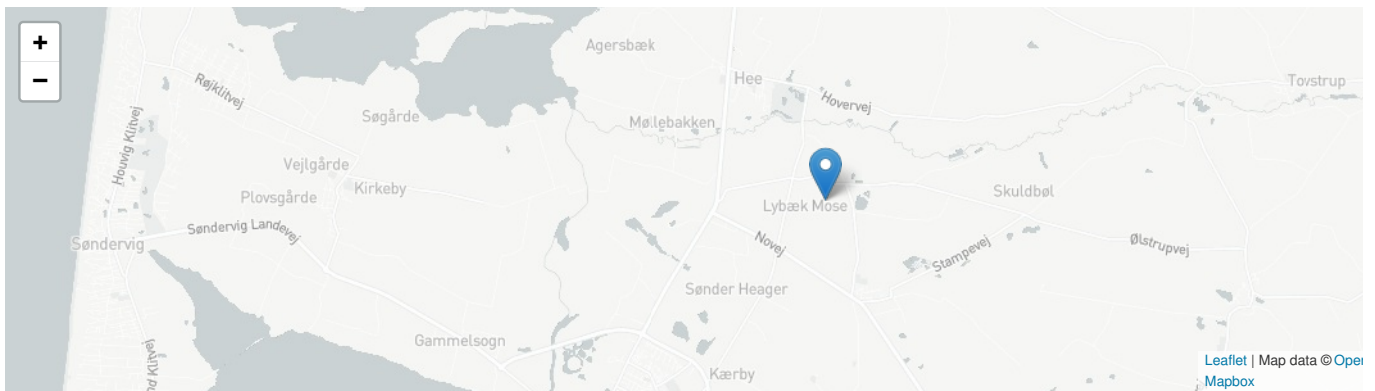
GHG in use : 3,10 KgCO<sub>2</sub>/m<sup>2</sup>/year

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 houses does not need much energy to be heated.it produces more energy than it consumes;
- The houses are more climate friendly than conventional construction;
- Rain water is running to a rain biotope, and from here to a brook, grey water runs to a central cleaning plant;
- Cross ventilation can be used in all rooms;
- The window surface temperature indicator shows comfort values on all major glacings. All U values better than comfort U values;
- Large south-facing windows with energy-efficient glass. Exploits solar heat and reduces heat loss;
- Bright and solar-heated rooms with good comfort and indoor climate both in summer and winter;
- Solar cells on roofs produce energy;
- Excess solar energy is used to heat domestic hot water.



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